SEX DIFFERENCES

SUMMARIZING MORE THAN A CENTURY OF SCIENTIFIC RESEARCH

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Dedication

This book is dedicated to the tens of thousands of men and women who conducted the studies that are herein cited. Whether these researchers still live or have died, this book is a testament to the efforts they made to reveal sex differences. The book is also a tribute to the scientific method that provides the intellectual arena within which the shroud cloaking these differences is slowly being lifted.

As the research continues to accumulate, the extent to which all sorts of sex differences exist will become ever more evident, and from this knowledge will emerge a better understanding of why. We trust future generations will use this knowledge wisely.

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Preface

In all known cultures, gender is the single most widely used criterion for categorizing people (Martin & Halverson 1981; Maccoby 1988:755; Bussey & Bandura 1999). As Freud (1933:113) observed, "when you meet a human being, the first distinction you make is 'male' or 'female.'" The emphasis we humans put on gender is partly the result of our being sexually reproducing animals. As such, we must be able to distinguish males and females with at least a fair degree of accuracy in order to reproduce successfully. Thus, natural selection has surely honed our sensitivities to maleness and femaleness.

Evolutionary forces may have even contributed to the fact that most human languages contain numerous gender distinctions, including tendencies to give sex-specific names to our children. So compelled are we to identify one another according to sex that we find it awkward to use sex-neutral pronouns when referring to each other, to other animals, and sometimes even to inanimate objects. Perhaps our brains are hardwired to make gender distinctions.

Purpose

In light of the attention that we humans give to gender in everyday life, it is not surprising that many hundreds of new scientific studies on sex differences are published every year. There are also theoretical and practical reasons for this research. In theoretical terms, documenting sex differences contributes to our understanding of many traits and to the sexual differentiation process itself. From a practical standpoint, knowledge of sex differences can lead to ways of reducing, eliminating, or possibly even exaggerating them, should we decide to do so.

With the ever-growing literature on sex differences, a problem is that researchers have become increasingly selective when referencing pertinent evidence. This selectivity runs the risk of both intentional and inadvertent biases. Consequently, a major goal of this book is to minimize biases in literature citations by providing the most complete coverage possible on all aspects of sex differences. Thus, no matter how redundant research findings may be on a particular topic, we have sought to include every relevant published study that could be located.

Readers will discover that numerous findings on sex differences have now been replicated dozens and sometimes even hundreds of times. Even so, for most sex differences, the research is still too sparse to warrant firm generalizations. In other cases, the evidence may be extensive and yet either inconsistent or quite complex. Nevertheless, amidst a multitude of unsettled sex differences are some that can now be regarded as scientifically irrefutable. In some of these latter cases, the research has done little more than confirm the obvious – such as documenting that in all cultures, adult males are taller than adult females. Other instances can be found in which sex differences would probably not have been expected, but are extremely well documented – such as in average weight at birth. For other sex differences, most of the studies will be shown to contradict stereotypes – such as in the case of pain tolerance.

Even when "common sense" is upheld, circumstances change, causing sex differences to vary from one culture to another. Furthermore, natural selection may operate to create sex differences between species as well as within species, and may possibly even impose changes over time. As a result, there is value in continuing to reassess, update, and synthesize what is discovered about how males and females differ. The present book has been assembled to help researchers make ongoing assessments of cultural and species variations in sex differences. With this knowledge, science should be in a better position in the future to offer well-founded explanations for why males and females are so often different.

In essence, the overarching goal of this book is simple but ambitious: *Bring together into a single volume as much scientific information as can be located on how males and females differ (or are the same), and do so in a way that can be easily updated as new studies are published.*

Early in this project, we agreed to make no restrictions regarding the types of traits or even the species of animals to be considered. Even studies of beliefs *about* sex differences (stereotypes, if you will) are included.

Our hope is that readers will find many uses for this distillation of sex difference research. Without claiming that our goal of comprehensiveness was achieved in this initial edition, researchers should be able to use what has been found to enhance understanding of life among sexually reproducing animals. With an emphasis on verifiability, the evidence throughout the book is presented in a way that permits those wishing to cross-check findings to do so.

Sex Difference Controversies

Despite the pervasiveness of scientific research on sex differences, the extent to which males and females actually differ remains a bone of contention, especially when attention is given to human behavior. One reason is the fear that any conclusions drawn may serve to reinforce and perpetuate stereotypes of what "must be" or what "should be." In an effort to avoid reinforcing sexist social customs and policies, some researchers have gone out of their way to downplay the differences they discover (Canary & Dindia 1998:3; Crawford & Kaufman 2006:192).

In a related vein, sex difference research continues to spark the centuries-old nature-nurture debate surrounding *causation* (Ward 1992:157). This debate remains fraught with intriguing scientific puzzles, and has become part of what one writer termed "a clash of cultures, of ideologies, and of politics" (Pool 1993:198). This means that the interests of some researchers in sex differences are being driven more by political agendas than by objective curiosity. As a result, emotional feelings and even moral convictions sometimes shade how findings are reported and interpreted.

This book largely avoids all explanatory aspects of sex difference research. It does, however, provide a platform on which future debates over etiology can be more objectively waged. Concerted efforts were made to avoid mistakes, although shortcomings in this regard are inevitable. Therefore, if any errors or omissions regarding the evidence contained within this book are identified, a simple internet procedure is presented later in this preface for correcting and adding to future editions.

The Male-Female Language Controversy

Serious, and even heated, debates have erupted over the use of terms such as *sex* and *gender* for describing male-female differences, especially regarding behavior. Since the 1970s (Unger 1979:1086), a common proposal has been to refer to the genetic/physiological aspects of males and females as *sex* and to use *gender* to refer to the learned/sociocultural aspects (e.g., Kandrack et al. 1991:580; Fausto-Sterling 1993; PL Walker & Cook 1998; Sebrant 1998; Reeder 2003; Aylor & Dainton 2004; Lewine 2004:755). We believe that attempting to make such a distinction is misguided for three reasons.

First and foremost, distinguishing *sex* from *gender* assumes that scientists *know* what aspects of maleness and femaleness are biological and what aspects are sociocultural. In fact, scientists still do not know what is responsible for most sex differences, especially when it comes to behavior (Sagrestano et al. 2006:382). The causes of sex differences will be determined empirically, not intuitively or from today's accepted wisdom. It already seems a safe bet that most differences between human sex differences will be found to result from the interaction of both biological *and* learned sociocultural factors. If so, those who advocate distinguishing sex from gender on the basis of what causes average male-female differences will have to use some sort of amalgamated term such as "sexder" to characterize most differences.

Second, if human males and females have both a sex and a gender, what about other animals? This question is particularly pertinent to this book because quite a number of tables will document traits in which the same basic male-female differences exist across a wide spectrum of species, not just among humans.

Third, if humans (and other animals) have both a sex and a gender, is gender a dichotomous variable (male-female) or is it continuous (masculine-androgynous-feminine)? Answers to this question continue to differ (see Hyde 2005). If, as some have suggested, gender is continuous and not dichotomous (e.g., Reeder 2003), logic would compel one to no longer use the word *gender* to refer to males or females (Deaux 1985). In this regard, several tables throughout this book will document how males and females are generally either male-typical/masculine or female-typical/feminine regarding various behavior patterns.

To put our perspective on the sex-versus-gender controversy in more succinct terms, as long as the possible values for the variable of sex or gender are identical (i.e., male, female), one is effectively dealing with a single variable no matter how many different names are given to it (e.g., sex, gender, male-female). Thus, we join others (e.g., LA Gilbert 1992:385; Nasser et al. 2002) in believing that it is best to consider the terms *sex* and *gender* as synonymous in the context of distinguishing males and females. Consequently, throughout this book, *gender*, *sex*, and *male-female* will all be used interchangeably. Readers wishing to maintain some sort of distinction between sex and gender may simply substitute the term *male-female* each time they encounter the words *sex* or *gender.*

History of the Project

The idea that it might be possible to compile a comprehensive book on gender differences came to the first-listed author in 1997. Over the ensuing months, he contacted other researchers known to be interested in sex differences to see if they would join in the project. Several declined, but within a year, enough had agreed to become involved to make the project seem feasible. With the indispensable help of dozens of student workers over the ensuing years, the book gradually took shape.

During the first two years, nearly all of the work was confined to reading articles and books containing reports of gender differences and recording the nature of these differences. By the third and fourth years, the thousands of citations that had accumulated to that point slowly began to be organized into computer-generated tables. In 2002, as the collection of new citations continued, increasing efforts turned to organizing what was by then over a thousand tables into chapters, and by 2003 we started writing narratives around each table. Since that time, we have continued to incorporate thousands of new citations, add hundreds of additional tables, and refine the narratives surrounding each table.

In the summer of 2005, a major setback befell our efforts to complete the project. The main computer containing the latest version of the book was stolen, resulting in the loss of approximately 150 hours of work. Fortunately, paper copies of most of the citations that had been entered had been retained, allowing us to eventually recover and reenter about 90% of the lost information.

The Book's Main Parameters

As already noted, the goal of this book was to compile and summarize all of the scientific evidence surrounding gender differences. In this first edition, over 18,000 studies are cited (many of which are cited more than once). Thus, within the 1,920 tables appear approximately 30,000 citations. There is no way of knowing how many studies are "out there" remaining to be included, but our estimate is that it is at least double the number contained in this edition. A more tangible indicator of the massiveness of the sex difference literature involves noting that over fifty newly published studies pertaining to these differences are appearing in the scientific literature each week (as discussed below).

In addition to attempting to be as comprehensive as possible, we settled upon two additional features for the book. First, it should be expandable in the sense that information can be updated in future editions. To accomplish this, we have devoted a separate table to every sex difference that could be located. Second, we wanted the book to be entirely verifiable and correctable. In this regard, information appears later in this preface for readers who detect any errors or are aware of any additional citations for inclusion in future editions.

Types of Sex Differences

Nearly all of the sex differences revealed in this book are of four types: average differences, differences in proportions, differences in variability, and trends in differences. Average differences are determined by adding the total scores for a variable divided by the total number of males and the total number of females. Proportional sex differences are usually expressed in percentage terms. Regarding sex differences in trait variability, researchers have sought to determine if the standard deviation for a trait is significantly greater for one sex than for the other. A few studies also pertain to trends in sex differences.

Characterizing Sex Differences

In nearly all of the tables, sex differences are described in terms of the gender exhibiting each trait to the greatest degree, regardless of the trait's desirability. The designation of "more" in some cases was arbitrary. For example, in the case of life expectancy, it could have been described in terms of which sex died earlier or which one lived longer (we choose to use the latter).

The extent of sex differences is generally not indicated (e.g., whether one sex exhibits a trait to twice the extent of the other). Only whether the difference was considered statistically significant or not was recorded. In this regard, it should be noted that most sex differences are relatively small (Canary & Hause 1993), and, for this reason, it should not be surprising that, even when there are real differences, they will not always be statistically significant.

Locating Relevant Publications

Almost every conceivable method for obtaining publications on gender differences was utilized, including leads from word-of-mouth, previously published reviews, email and internet searches, interlibrary loans, and simply thumbing through journals. Nevertheless, the most extensively used source by far involved systematically searching through weekly issues of *Current Content*s for both the *Life Sciences* and the *Behavioral and Social Sciences* since the early 1990s. (Profound gratitude is extended to Dr. Eugene Garfield of the Institute for Scientific Information for developing this resource and providing access to it throughout the course of this project.)

Searching *Current Contents* was done electronically by flagging all references containing the words *sex* or *gender*. Copies of nearly all of the flagged publications were then sought either directly from their first authors or from library sources. In this way, at least 50 new articles were identified every week since the mid 1990s (in the last few years, the numbers have crept upward toward 70 per week).

Reflecting the cumulative nature of the scientific method, nearly all of the contemporary articles with information about gender differences also cite prior relevant publications. If everything appeared clear and credible in these secondary citations, they too were included in the book's tables without reading them first-hand. When doubts arose concerning the accuracy of a secondary citation, copies of the relevant primary sources were obtained for verification.

Organization of the Book

The book's findings have been organized into the following twelve primary chapters:

- Chapter 1 – Basic Biological Factors
- Chapter 2 – The Brain and Biochemistry
- Chapter 3 – Health and Illness Factors
- Chapter 4 – Perceptual, Motor, and Emotional Factors
- Chapter 5 – Intellectual, Cognitive, Self-Concept, and Mental Health/Illness Factors
- Chapter 6 – Preferences, Interests, Attitudes, Beliefs, and Intentions
- Chapter 7 – Drug-, Therapeutic-, and Stress-Related Responses
- Chapter 8 – Personality and General Behavior

- Chapter 9 – Social Behavior
- Chapter 10 – Consuming and Individual-Institutional Interactions
- Chapter 11 – Stratification and Work-Related Behavior
- Chapter 12 – Attitudes and Actions toward Others in Relationship to Their Gender

A final "grand summary" chapter (Chapter 13) provides a condensation of all of the findings from the tables in the initial twelve chapters that contained at least ten findings from studies of human subjects. The special statistical treatment given to these tables is described near the end of this preface.

Structure of the Tables

All studies pertaining to gender differences are presented within tables, even if just one relevant study was located. Accompanying each table is a narrative that describes the nature of each variable (unless it is well known) and then characterizes the evidence provided by the table (along with any noteworthy qualifications).

Most of the tables have the same overall format. The three options with respect to gender differences – *males more*, *no significant difference*, and *females more* – are listed along the left side. Across the top, the following age categories are identified: *infant* (in humans, under one year of age), *toddler* (in humans, 1 to 2 years of age), *early childhood* (in humans, 3 to 5 years of age), *childhood* (in humans, 6 to 12 years of age), *adolescent* (in humans, 13 to 18 years of age), *adult* (in humans, 19 years and older), and *multiple age categories*. In this latter case, the study's sample either encompassed both adolescent and adult subjects or a qualifier following the citation specifies the age groups involved.

To enable readers to look for possible cultural variations in the research findings, the country within which each study was conducted is indicated. When special subpopulations were sampled, ethnic and tribal identifiers appear in parentheses immediately following the relevant citation.

Countries are organized with regard to the region of the world in which they are located. The regional categories used were as follows: *Africa*, *Asia*, *Europe*, *Latin America*, *Middle East*, *North America*, and *Oceania* (the latter primarily encompassing islands in the Pacific and Indian Oceans). In some cases, islands were subsumed under nearby continents. For example, Britain and Iceland were listed under *Europe*, and both Japan and Taiwan were considered part of *Asia*. All of the American countries and islands of the Caribbean in which Spanish or Portuguese are the dominant languages were subsumed under *Latin America*. In the case of Hawaii, it was considered part of *Oceania* when information was available for it specifically; otherwise its data were treated simply as part of the *United States*.

While most of the studies were based on research involving human subjects, about 10% are derived from observing other animals. When nonhumans were the subjects of study, reasonable judgments were made to indicate the age of the animals sampled in terms of their human equivalencies. Citations to studies of nonhuman animals are included in the tables according to species (or species type) rather than according to the country in which they lived. The closer the species is to humans in phylogenic terms, the more specific was the species classification. For example, chimpanzees, gorillas, orangutans, and gibbons were subsumed under *ape*, while all species of monkeys and prosimians were categorized as *primate other than ape*.

What Constitutes Published Research

The basic criterion used for including research findings in this book was that the findings must have been published. No restrictions were made in terms of the language in which the report was written. Fortunately, in this regard, nearly all scientific research reports are either published in English or at least contain an English language abstract, and English is the native language of all but two of this book's authors.

The criteria used to consider a study as having been *published* included their having appeared in the form of a journal article and book. Dissertations were also considered "published," but master's theses and conference papers were not unless they appeared in a formally bound proceedings book generally available through library sources. Material that was available only on the internet without evidence of paper copies being available through public library sources was not considered "published."

Comprehensiveness and Inconsistencies in the Findings

Most of the tables are either highly consistent or at least fairly consistent in indicating a specific gender difference. Nevertheless, scattered throughout the book are citations to studies whose findings are not consistent. Some of these exceptional findings can be dismissed as chance events attributable to small sample sizes and/or to the fact that many gender differences themselves are *in fact* so minuscule as to yield inconsistent results from one study to the next. Readers should bear in mind that the concept of *statistical significance* used in nearly all of the studies cited in this book allows for a 5% chance of the finding being a statistical fluke. Other reasons for inconsistencies within tables are as follows:

First, some researchers may have made errors in their mathematical notations or calculations. Such events are inevitable given that science is, alas, a human enterprise.

Second, much of the data on human sex differences derive from self-reports by ordinary people. Questions are sometimes phrased in ways that are misinterpreted, or subjects purposely misreported due to embarrassment or to a desire not to offend or disappoint those seeking the information.

Third, few samples used in research on human behavior and health are completely representative of a national population (Sher & Trull 1996; Hartung & Widiger 1998). This means that two studies of the same sex differences might be carried out in the same country, but one study might be based on interviews of college students in the United States while the other was derived from mailed questionnaires completed by home residents. If these two studies happened to reach opposite conclusions regarding any sex differences, both could be correct for their particular split-populations.

Fourth, not all studies will be in agreement because the answers to some questions about gender differences may vary according to the culture, time frame, or species being studied. When these types of variations seem to be involved, the narratives surrounding tables allude to such possibilities.

Fifth, the authors and other contributors to the present book may have erred in reading studies and/or in transcribing findings into the most pertinent table. If readers detect any questionable entries, they are encouraged to consult the original report to confirm their suspicions. If confirmed, please visit the website for revisions and updates to this book and provide the necessary corrective information. The location for this website is provided at the end of this preface.

Finally, to an unknown degree, researchers may be more likely to publish findings in which significant sex differences are found than those in which no such differences are found. If so, many of the tables in this book may provide at least a slightly inflated estimate of the actual degree to which males and females differ rather than an underestimate.

The Book's Analytic Character

Does the present book constitute a meta-analysis? A meta-analysis is sometimes defined as "a study of studies," and, in this sense, this book is unquestionably a meta-analysis. However, in a narrower sense, a meta-analysis involves converting the findings from all relevant studies to a common statistic and adjusting for variations in sample size. In this sense, our book is not a meta-analysis.

Perhaps the best description for the approach taken by the present book is that it is a *type* of meta-analysis that uses a *ballot-box* or vote-counting method rather than statistical conversion to a common statistic (Hedges & Olkin 1985:47; Jarvis 1992:1252). What qualifies a study to cast a vote is the fact that it was published as an empirical investigation. Each "vote" can be for one of three outcomes: *males more*, *no significant difference*, or *females more*. Rather than attempting to adjust each finding according to the sample size, each finding carries the same weight as all others. Nevertheless, in some of the narratives surrounding a table, comments are made to suggest that some qualitative assessments are in order.

There were three reasons the ballot-box approach was adopted instead of the more conventional (effect size) type of meta-analysis. First, the ballot-box approach is easier in the sense that one does not have to do anything more than determine if a particular sex difference was statistically significant in each individual study. No adjustments had to be made for variations in a study's sample size or other measures of statistical power. Second, a conventional meta-analysis does not lend itself well to accommodating variations over time, by age, or from one culture to another. This is because a conventional meta-analysis involves pooling results from all of the available studies into a single statistic. Detecting temporal, age-related, and cultural variations was something we considered important to preserve because one of the hoped-for outcomes of this book is to begin revealing the extent to which sex differences have cross-cultural variability. Even variations in sex differences across species can be detected using the present book's methodology. Third, when compared to the more conventional type of meta-analysis, the vote-counting version lends itself to being much more easily updated as additional studies are reported.

Statistical Significance

Despite its limitations, the concept of *statistical significance* has been, and continues to be, a valuable tool for scientists who must base almost all of their research findings on samples. Throughout this book, we have relied on whatever statistical significance test a researcher used in a particular study (unless specifically indicated otherwise). In the vast majority of cases, this means that the maximum degree of sampling error allowed was .05. Nearly all of the studies cited assumed the more conservative two-tailed version of whatever statistical text that was used. Where this was not the case, and the less conservative one-tailed test would have made the differences between significance and non-significance, both results are indicated within the relevant table.

Citation Style

Slight variations on the widely used American Psychological Association (APA) style of citation are employed throughout this book. The key features that deviate from the APA style are as follows:

To help reduce confusing the enormous number of references, a seemingly common last name for a citation's lead author is preceded with the author's initials (without periods or spaces between them). Thus, an article by *Smith* would be preceded with his/her initials, such as *AW Smith*.

To keep citations as brief as possible, when an article, chapter, or book had three or more authors, it was simply referred to by the first author's last name (plus initials, if the name was common) and the notation *et al.* followed by the year of publication. No commas are used to separate authors and the year their work was published, although, in many instances, a page number is cited following the year of publication in order to assist readers wishing to verify a particular finding, especially in the case of lengthy publications.

Special Notations and Qualifiers

Few arbitrary symbols and notations are used anywhere in this book. The most common special notation employed in the tables is an asterisk (*). This symbol signifies that a particular study is cited more than once within that particular table. The two main reasons for multiple citations to a study within a table are these: First, one study may have sampled two or more age groupings (as specified in the tables), and so the nature of the gender difference is indicated for each age category sampled. Second, a study might report results for two or more different countries or two or more different ethnic groups. For each country or group, the nature of the gender differences for the trait in question will be indicated following the asterisk.

Also appearing frequently after table citations are what are called *qualifiers*. A qualifier is a word or phrase that serves to delimit the nature of the sample used in a particular study. For example, if the subjects of a study were college students (which we considered adults), the word "college" appears after the study's citation. If persons over 60 were predominantly sampled, the word "elderly" is noted following the study's citation. Similarly, if a study's subjects were all in the range of 5 or 6 years of age, they would be classified under "childhood," but with a qualifier "young." Many other qualifiers appear after particular citations to provide information about the type of methodology used to obtain the data, such as indicating that a particular study was based on self-reports as opposed to a clinical diagnosis.

Sex differences may vary not only from one society to another, but within societies as well, especially over extended periods of time. In this regard, one can note that the vast majority of studies (~ 95%) are published within a decade after the data for the study were collected. However, there are exceptions, such as when centuries-old church records are used to reveal marriage patterns and birth rates. Therefore, to give some time-dimension to the studies reviewed besides those associated with the year of publication a special notation is made following any study based on data collected prior to the 20th Centuries. Thus, if *19th Century* appears as a qualifier following a particular study, data for that study were obtained sometime in the 1800s even if the study itself was published much more recently.

Studies in which Statistical Significance Was Not Reported

In a few studies, such as population-wide studies of an entire country, statistical significance was not reported. The following guidelines were used to assign such a study's results into one of the three outcome options: If more than five percentage points separate one gender from the other, a significance gender difference was declared; if the percentage difference was less than five, the finding was considered non-significant. Fewer than a dozen studies are cited throughout this book for which this note is relevant.

Assessing Human Universals

For each table in which at least 10 findings were located pertaining to humans, an indicator of the universality of the trait is presented. This is called the *Consistency Index* (*CI*). The formula used to derive the CI was as follows:

CI = TSD – (NSD + 2CSD)/TSD
Where ***TSD*** is the total number sex difference findings that were located,
NSD is the number of findings of no significant sex difference, and
CSD is the number of findings of a sex difference contrary to the majority.

Three simple hypothetical examples will illustrate how a CI was derived. For the first example, assume that 40 studies were conducted concerning a possible sex difference in Variable V and that all of these studies concluded that females exhibited Variable V to a greater extent than did males. In this case, the CI would be 40 – (0 + 0) divided by 40, yielding $CI_{(40)} = 100$.

In the second hypothetical example, assume that 40 studies were located bearing on Characteristic C, and that 38 of these studies found males scoring significantly higher than chance probability, while the remaining 2 studies found no significant gender difference. For Characteristic C, the CI score would be 40 – (2 + 0) divided by 40, yielding $CI_{(40)} = 95$.

The third example will be slightly more complicated. Assume once again that 40 studies were located concerning gender differences in Trait T, and that 34 of these studies found females exhibiting this trait to a greater than chance degree. Of the remaining studies, 4 found no significant gender difference, and 3 studies actually found males exhibiting Trait T to a significantly greater extent than females. Under these circumstances, the CI score would be calculated as follows: 40 – (4 + 6) divided by 40, yielding $CI_{(40)} = .75$.

While the actual scores for each consistency index will be presented, they will be grouped into six categorical levels for summary purposes. These summary categories are as follows:

Categorical Descriptors	CI scores
Essentially a certain sex difference	100% consistency
A well established sex difference	95-99% consistency
An established sex difference	85-94% consistency
A probable sex difference	70-84% consistency
A possible sex difference	50-69% consistency
An un-established sex difference	Below 50% consistency

As mentioned earlier, consistency index scores are only presented for tables in which at least 10 findings involving humans were located. In some cases, if at least 10 findings were located for more than one age category, then separate CI scores were calculated for each age grouping. The reasons for doing so will be explained more in Chapter 13.

A closing comment to make regarding the derivation of consistency index scores is that several studies report more than one finding pertinent to a given table. (As mentioned earlier, these studies are marked with an asterisk.) For instance, a study might have sampled by school age children and adolescents, and in both cases found females exhibited a particular trait more than males. This study would be counted twice in deriving the consistency index.

Following each CI score is a second number, termed a *DI* (for *Diversity Index*). The DI is derived by counting the number of countries, cultures, and centuries for which a particular sex difference was reported. A few studies did not report the exact number of countries/cultures (such as studies whose samples came from "several industrialized countries" or "multiple cultures"). In these cases, one or more plus signs (+) appear after the DI value. If studies of a particular country involved not only the 20th or 21st Century, but also an earlier century, that country was counted twice (as though it were another country) in deriving the DI. (For studies of nonhumans, the DI was derived by counting the number of species sampled in a particular table.)

To illustrate the DI, assume that 40 findings were used to derive a particular CI. Further assume that 30 of these findings were based on samples drawn from just one country (the United States, for example), and that the remaining 10 findings came from two other countries. This would mean that the DI would be 3 unless one or more of the studies had been carried out in a century prior to 1900. Assume for instance that one of the studies from the country with 30 studies had been based on a population surveyed in the 1830s while all of the remaining studies were based on 20th or 21st Century samples. Accordingly, the final DI for that particular table would be 4.

In summary, two indices of *universality* are used in Chapter 13 for every table in which at least 10 findings of human sex differences were located: a consistency index and a diversity index. The first number (the CI) indicates how consistent the reports of gender differences have been (along with the actual number of studies involved), while the second index (the DI) provides a rough estimate of the extent to which the samples were derived from numerous cultures and time frames (or from different species in the case of non-humans). The higher each of these two numbers, the stronger would be the inference that a particular sex difference is universal. The tables containing these scores will be given special attention in this book's final chapter.

We wish to emphasize that all CIs and DIs reported in this book should be considered conservative and imperfect numeric estimates. They are conservative in the sense that there is bound to be considerably more societal and cultural diversity than that revealed by merely counting the number of societies/cultures and centuries during which studies were conducted. Regarding imperfections embedded in these two indexes, they include measurement and sampling errors contained within each study cited, our failures to locate all of the relevant research, and our incorrectly interpreting (or qualifying) reported findings.

Corrections and Future Editions of This Book

Despite our *goal* of including citations and references to every scientific study ever published on sex differences, we have no illusion that such a goal was accomplished in this book's initial edition (although 30,000 citations to 18,000 studies is certainly a start). Readers are invited to assist in improving future editions by providing information on any errors or omissions that they identify. Comments pertaining to these errors or omissions may be easily posted at the following web address: http://www.psypress.com/sexdifferences. Also, if any significant errors in the first edition are found, we will post the corrections at this same web location.

Chapter 1

BASIC BIOLOGICAL FACTORS

Biological variables are all those having to do with life. This would include an animal's anatomy, physiology, and even how it thinks and behaves. Thus, in the broadest sense of the word, this entire book is about the biology of sex differences. However, in a narrower sense, variables having to do with behavior, emotions, cognition and the like are conceptualized as being outside the realm of biology, so that this book extends to such non-biological topics as thought, feelings, and behavior.

In this initial chapter, findings pertaining to some of the most basic biological factors of all will be examined. Studies of such things as sex ratios at birth, birth weights, adult weights, sizes of various bodily organs, and bodily functioning will receive attention.

Omitted from this chapter are the variables of behavior, emotions, and cognition. Also, because of their complexity and extensiveness, other biological factors – such as the brain, biochemistry, health/illness, and physiological responses to drugs and to stress – will be covered in later chapters.

1.1

THE BEGINNINGS AND MAJOR TRANSITIONS OF LIFE

This initial section is concerned with some of the most fundamental aspects of life in sexually reproducing animals, such as the proportion of species members who are of each sex. Also considered are the rates at which males and females mature.

1.1.1. Sex Ratios

A population's sex ratio refers to the proportion of each sex at a given point in time or stage in development. Sex ratios are of interest to biologists because these ratios vary considerably from species to species, a fact that continues to beg for evolutionary as well as physiological explanations. Even sex ratios in species of plants – not a topic of review in this book – have been the focus of scientific inquiry (DR Taylor 1999).

The sex ratio at or near to the time of conception is considered the *primary sex ratio* while the ratio at birth (or hatching) is termed the *secondary sex ratio*. Statistics on sex ratios any time following birth are usually referred to as *tertiary sex ratios*. As this section shows, most of the research involving sex ratios has to do with those observed at the time of birth.

1.1.1.1. Sex Ratio During Gestation (Primary Sex Ratio)

Research regarding the *primary sex ratio*s is largely confined to the study of aborted and miscarried human fetuses. As shown in Table 1.1.1.1, these studies indicate that males are conceived at substantially higher rates than females. The degree to which male conceptions outnumber female conceptions has been rated to be as high as 160 to 100 in humans (Moore & Persaud 1998). By the end of the first trimester, the sex ratio in humans appears to be closer to 130 to 100. Among non-human species for which data are available, the sex ratio also favors males, with ratios of 180 to 100 for hamsters and 122 to 100 for rabbits. The only animal for which no significant male-female differences were found involved a species of fish.

Table 1.1.1.1. Sex ratio during gestation (primary sex ratio).

Nature of Any Difference	At or Shortly After Conception	Later in Gestation
More males	**ASIA** *Japan*: Mizuno 2000 **EUROPE** *Britain*: FA Woods 1939 (royal families); Hytten 1982; *Germany*: Auerbach 1912 **NORTH AMERICA** *United States*: Potter 1940; Kukharenko 1970 (151/100 in second month); MM Mcmillen 1979; Hassold et al. 1983; Byrne & Warburton 1987; KL Moore & Persaud 1998 **MAMMAL** *Rabbit*: Shaver & Carr 1969 (122/100) **RODENT** *Golden Hamster*: Sundell 1962 (160/100)	**NORTH AMERICA** *United States*: Kukharenko 1970 (end of 1st trimester)
No signif difference	**RODENT** *Gerbil*: MM Clark et al. 1990 (sex of fetuses in the uterine horn)	**FISH** *Barbel*: Baras 1992
More females		

1.1.1.2. Sex Difference in Fetuses Aborted

A limited number of studies have identified the sex of induced aborted fetuses (not including miscarriages). As shown in Table 1.1.1.2, findings have been inconsistent. This may be at least partly due to two countervening factors. First, many more males are conceived than females (roughly 130 to 100, as noted in the above table on humans); thus, by chance they are more likely to be aborted. Second, in some countries, female fetuses are selectively aborted.

Table 1.1.1.2. Sex difference in fetuses aborted.

Nature of Any Difference	Citations
More males	**ASIA** *Japan*: Yamamoto et al. 1977; Ohama 1978 **NORTH AMERICA** *United States*: Kukharenko 1970 (end of 1st trimester); Byrne & Warburton 1987
No signif difference	
More females	**ASIA** *China*: Junhong 2001; *India*: Patel 1989; *Japan*: Kajii et al. 1978; *South Korea*: Park & Cho 1995

1.1.1.3a. Sex Ratio at Birth (Secondary Sex Ratio) for Humans in North America

An enormous number of studies have been published regarding *secondary sex ratio*s. Therefore, the results are presented in three split-tables, one for humans in North America, one for humans elsewhere in the world, and the other for non-humans. Split-Table 1.1.1.3a shows that nearly all studies of humans in the North America have found that the number of males born significantly exceeds the number of females born. The most typical ratio is in the vicinity of 103-106 males for every 100 females.

Split-Table 1.1.1.3a. Sex ratio at birth (secondary sex ratio) for humans in North America.

Nature of Any Difference	Citations
Males more prevalent	**NORTH AMERICA** *Canada*: BB Allan et al. 1997; Jongbloet 2004:772; *United States*: Parkes 1926; Crew 1927; Schultz 1928; H Bakwin 1929; S Winston 1931; Ciocco 1938c; ME Bernstein 1948:184; Novitski 1953; Slatis 1953; ME Bernstein 1954; MacMahon & Pugh 1954:286; Fancher 1956:318 (upper class); Novitski & Kimball 1958; Lyster 1971; Teitelbaum & Mantel 1971; JD Erickson 1976; Curtsinger et al. 1983; BB Little et al. 1987 (fathers who were pilots & astronauts); US Bureau of the Census 1988; Mackey 1993:192; Milham 1993:830; WH James 1995:244; Mittwoch 1996; Guest et al. 1998:27; Marcus et al. 1998 (Blacks); Fuentes-Afflick et al. 1999:149; Nicolich et al. 2000; L Ellis & Blanchard 2001:550; Grech et al. 2002:1011*; WH James 2003 (Blacks); JM Mills et al. 2003; Norberg 2004
No signif difference	**NORTH AMERICA** *United States*: Heron 1906
Females more prevalent	**NORTH AMERICA** *Canada*: Mackenzie et al. 2005 (Aamjiwnaang community, near large petrochemical plants)

1.1.1.3b. Sex Ratio at Birth (Secondary Sex Ratio) for Humans in Countries Outside North America

As with humans born in North America, studies elsewhere in the world have found significantly more males than females born (Table 1.1.1.3b).

Split-Table 1.1.1.3b. Sex ratio at birth (secondary sex ratio) for humans in countries outside North America.

Nature of Any Dif-ference	Citations
Males more prevalent	**AFRICA** *Ethiopia*: MA Gibson & Mace 2003 (rural); *Nigeria*: Ayeni 1975; *South Africa*: N Howell 1979:247 (!Kung tribe) **ASIA** *China*: Coale 1984:28; Wu 1988; TH Hull 1990; Coale 1991; Johansson & Nygren 1991; Zeng et al. 1993; Tomlinson 1994; Xu et al. 1994; BA Anderson & Silver 1995; Ren 1995; N Riley 1996; Li et al. 2000; Lavely 2001; Leung et al. 2002; Secondi 2002:220; Klasen & Wink 2003; Lai 2005:317; *India*: Visaria 1971; Visaria 1972; Kumar 1989; TH Hull 1990; Kanitkar 1991; Kundu & Sahu 1991; Dyson 1994; Srinivasan 1994; Das Gupta & Bhat 1997; P Mayer 1999; Peng & Huang 1999; P Griffiths et al. 2000; Bhat 2002; Guillot 2002; Bhargava 2003:228; Retherford & Roy 2003; Jayaraj & Subramanian 2004:107; *Japan*: de Jastrzebski 1919*; WT Russel 1936; Imaizumi & Murata 1981; Fukuda et al. 1998; Mizuno 2000; Sakamoto et al. 2001:94*; *Korea*: WT Russell 1936; Kang & Cho 1959:189; Visaria 1967*; CB Park & Cho 1995; *Pakistan*: Visaria 1967*; *Russia*: Antonov 1947; *Taiwan*: CY Yang et al. 2000 (high petroleum polluted area); *Vietnam*: Goodkind 1995; Belanger et al. 2003 **EUROPE** *Austria*: de Jastrzebski 1919* (Jews); Grech et al. 2002:1011*; *Belgium*: Grech et al. 2002:1011*; *Britain*: Graunt 1676 (17th Century); Darwin 1874* (19th Century); Punnett 1904; Tidswell 1912; SJ Holmes & Goff 1923:236*; FA Woods 1939* (royal families); WJ Martin 1942; Beiles 1974 (19th Century); WH James & Rostron 1985; Grech et al. 2002:1011*; Leung et al. 2002 (preconception smoking parents); Heron & Ness 2004 (preconception smoking parents); *Bulgaria*: Grech et al. 2002:1011*; *Croatia*: Polasek et al. 2005 (during 1991 – war); *Czech Republic*: Grech et al. 2002:1011*; *Denmark*: Bromen & Jockel 1996; Moller 1996 (1851-1995); Moller 1996; Hansen 1999; Grech et al. 2002:1011*; Obel et al. 2003 (preconception smoking parents); *Finland*: Vartiainen et al. 1999; Lummaa et al. 1998; Huopaniemi et al. 1999; S Scott & Duncan 1999 (17th & 18th Centuries); Vartiainen et al. 1999; Grech et al. 2002:1011*; *France*: Darwin 1874 (19th Century)*; Grech et al. 2002:1011*; *Germany*: Matzdorff 1981:640; van den Broeck 1997; Lerchl 1998; Lerchl 1999; Grech et al. 2002:1011*; Catalano 2003; Kemkes-Grottenhaler 2004 (17th & 18th Century); *Greece*: Grech et al. 2002:1011*; *Hungary*: Da Jastrzebski 1919; Grech et al. 2002:1011*; *Iceland*: Grech et al. 2002:1011*; *Ireland*: JB Moynihan & Breathnach 1999; Grech et al. 2002:1011*; *Italy*: Savorgnan 1933; Ulizzi & Zonta 1993; Ulizzi & Zonta 1995; Astolfi & Zonta 1999 (urban); Grech et al. 2002:1011*; Cagnacci et al. 2004; *Luxembourg*: Grech et al. 2002:1011*; *Malta*: Grech et al. 2002:1011*; *Netherlands*: Z Stein & Susser 1975; van den Broeck 1997; van der Pal-de Bruin et al. 1997; Grech et al. 2002:1011*; *Norway*: Grech et al. 2002:1011*; *Poland*: Grech et al. 2002:1011*; *Portugal*: Grech et al. 2002:1011*; *Prussia*: von Fircks 1889 (19th Century); *Romania*: Grech et al. 2002:1011*; *Scotland*: GG Smith 2000; *Slovenia*: Zorn et al. 2002; *Spain*: Grech et al. 2002:1011*; *Sweden*: SJ Holmes & Goff 1923:247*; Grech et al. 2002:1011**; JM Mills et al. 2003:1244;Catalano & Bruckner 2004:539; *Switzerland*: Grech et al. 2002:1011*; *Multiple European Countries*: Gini 1908; Savorgnan 1933; WT Russell 1936; Grech et al. 2000; Martuzzi et al. 2001; Stini 2003:25*Yugoslavia*: Polasek 2006 (1991 – 1995 during war in former Yugoslavia) **LATIN AMERICA** *Cuba*: Heape 1908a* (Whites); *Ecuador*: F Baker 1969; *Mexico*: Grech et al. 2002:1011*; *Venezuela*: Chacon-Puignau & Jaffe 1996:265; *Multiple Countries*: Feitosa & Krieger 1992; Feitosa & Krieger 1993 **MIDDLE EAST** *Iran*: Ansari-Lari et al. 2002* (general population); Saadat et al. 2002* (near natural gas leakage); *Israel*: Riis 1999:37 **OCEANIA** *Australia*: Australian Bureau of Statistics 1997; T Hurst et al. 1997; *Micronesia*: Krzywicki 1934:230; EE Hunt et al. 1965; M Marshall 1975; Nason 1975; Federated States of Micronesia 1988:17; Brewis 1992; Brewis 1993; JH Underwood 1993; JH Underwood 1995 *Japan*: Fukuda et al. 2002* (among nonsmoking parents) **INTERNATIONAL** *Multiple Industrial Countries*: Feitosa & Krieger 1992; Ulizzi & Zonta 1994:1040; DL Davis et al. 1998; Graffelman & Hoekstra 2000:439; Jongbloet et al. 2001; *Multiple Countries*: Mackey 1993:192* (in 92/96 countries); DL Davis et al. 1998; Parazzini et al. 1998; Saith & Harriss-White 1999
No signif difference	**ASIA** *Korea*: Matsuyama 1944 **LATIN AMERICA** *Cuba*: Heape 1908a (Blacks) **OCEANA** *Japan*: Fukuda et al. 2002* (among smoking parents) **INTERNATIONAL** *Multiple Countries*: Mackey 1993:192* (in 4/96 countries)
Females more prevalent	**AFRICA** *South Africa*: N Cameron et al. 1998:497 (75% Blacks) **ASIA** *Japan*: Sakamoto et al. 2001:94* (in years following widespread methyl mercury pollution); Fukuda et al. 2002 (parents who smoked prior to conception); *Taiwan*: Yang et al. 2000a (near petroleum refinery) **EUROPE** *Italy*: Mocarelli et al. 1996 (in communities near a large dioxin leakage); Mocarelli et al. 2000 (in communities near a large dioxin leakage); Astolfi et al. 2001 (among fathers with the B15 HLA genotype) **LATIN AMERICA** *Columbia*: Zaldivar et al. 1991:489 (the Bari) **MIDDLE EAST** *Iran*: Saadat et al. 2002* (in high-petroleum air polluted region); *Turkey*: Jarrell et al. 2002 (mothers exposed to high levels of hexachlorobenzene) **INTERNATIONAL** *Multiple Countries*: D Hansen et al. 1999 (severely stressed mothers); WH James 2000:446 (schizophrenic women); *Several Industrial Countries*: Klasen 1994

By examining the exceptions – i.e., studies in which more females than males were born – one notices that nearly all exceptions involve populations in which one or both parents were exposed to toxic substances or environmental pollutants around the time of conception or during pregnancy. This is consistent with the hypothesis that male fetuses are more vulnerable than their female counterparts to being miscarried if conditions are not close to optimal for maintaining pregnancy (Sakamoto et al. 2001:92). Nevertheless, there may be ethnic-related genetic factors (particularly involving the immune system) that also operate to affect secondary sex ratios (Astolfi et al. 2001).

1.1.1.3c. Sex Ratio at Birth/Hatching (Secondary Sex Ratio) for Non-Humans

Results of the research on the *secondary sex ratio* for nonhuman species are shown in Split-Table 1.1.1.3c. These studies reveal a wide array of conclusions, with about half of the studies finding more males than females being born, while the remaining half have either reported no significant difference or a significantly greater number of females than males born.

Split-Table 1.1.1.3c. Sex ratio at birth/hatching (secondary sex ratio) for non-humans.

Nature of Any Difference	Citations
Males more prevalent	**BIRD** *Bee-eaters*: Fry 1972; *Grackle*: HF Howe 1977; *Honeyeater*: Dow 1977; *Mockingbird*: Kinnaird & Grant 1982; *Pied Kingfisher*: Reyer 1980; *Pigeon*: Cuenot 1900; LJ Cole & Kirkpatrick 1915:465; *Redwing Blackbird*: McIlhenny 1940*; JH Myers 1978; *Skuas*: Kalmbach et al. 2001:2177; *Super Blue Wren*: Rowley 1965; *Tasmanian Hen*: Ridpath 1972; *Woodpecker*: Gowaty & Lennartz 1985; *Zebra Finch*: von Engelhardt et al. 2004* (under natural conditions) **CANINE** *Fox*: Maciejowski 1972; *German Shepherd*: Whitney 1939; *Greyhound*: Darwin 1874*; *Wolf*: Mech 1975; *Multiple Species*: Ludwig & Boost 1951 **FELINE** *Lion*: C Packer & Pussey 1987 **FISH** *Eelpout Fish*: Larsson & Forlin 2002 (eggs that hatched near an industrial pulp mill) **INVERTEBRATE** *Butterfly*: Darwin 1874*; *Fly*: Mohr & Sturtevant 1919; Mohr 1923; TH Morgan et al. 1925; H Redfield 1926; Gershenson 1928; *Moth*: Rau & Rau 1914:42; *Potato Moth*: IO Howard 1917:24 **LAGOMORPH** *Rabbit*: Shaver & Carr 1969 (105/100) **MARSUPIAL** *Opossum*: Austad & Sunquist 1986* (under well fed conditions); CN Johnson et al. 2001 **MUSTELID** *Mink*: Enders 1952 **PINNIPED** *Gray Seal*: Coulson & Hickling 1961 **PRIMATE (EXCEPT APE)** *Macaque*: Broadhurst & Jinks 1965; Roonwal & Mohnot 1977; DP Martin 1984; Rawlins & Kessler 1986; Small & Smith 1986; CM Berman 1988; Cheney et al. 1988; Silk 1988; Aureli et al. 1990; Paul & Kuester 1990; Silk et al. 1993; Rhine 1994; Dittus 1998; Bercovitch et al. 2000:3; *Prosimian*: AB Clark 1978 **REPTILE***: Lizard:* A Cree et al. 1995 (when *Sphenodon punctatus* & *Sphenodon gunteri* eggs incubated at 22 degrees C); *Turtle:* D Crews et al. 1994* (when eggs incubated at 26 degrees C) **RODENT** *Mouse*: Weldon 1906; Ibsen 1922; MacDowell & Lord 1925; Parkes 1926; Howard et al. 1955; Burley 1982; Machado et al. 2001:1196; *Golden Hamster*: Sundell 1962 (106/100); *Rat*: HD King 1918; HD King 1921; Slonaker & Card 1923 (albino rat); HD King 1924; Moriya & Hiroshage 1978* (normal temperature) **UNGULATE** *Cattle*: Wilckene 1886*; Johansson 1932; Foote 1973; Maramatsu & Kawanishi 1975* (black angus); Skjervold & James 1979; Behboodi et al. 2001:32; *Deer*: WC Miller 1932; Robinette et al. 1957; Borg 1971; Dapson et al. 1979; Clutton-Brock et al. 1982; Hewison & Gaillard 1996:462; *Horse*: Gochlert 1882; *Pig*: Wilckene 1886*; Parker 1914; McPhee et al. 1931; Nishida et al. 1977; *Red Deer*: Clutton-Brock et al. 1981; *Sheep*: Napier & Mullaney 1974
No signif difference	**AMPHIBIAN** *Dart Poison Frog*: Bunnell 1973 **BIRD** *Great Tit*: Oddie & Reim 2002:506; *Woodhoopoe*: Ligon & Ligon 1990; *Woodpeckers*: Walters 1990; Koenig & Walters 1999:127 **CANINE** *Wild dogs*: JR Maloom & Marten 1982 **FISH** *Gambusia*: Hildebrand 1927 **INVERTEBRATE** *Ladybird Beetle*: GDD Hurst et al. 1993; Zakharov & Goryacheva 1998 **MARSUPIAL** *Opossum*: Austad & Sunquist 1986 (under normal feeding)*; *Seal*: Stirling 1971 **PRIMATE (EXCEPT APE)** *Baboon*: Rhine et al. 1992; *Japanese Macaque*: Koyama et al. 1992; Nevison et al. 1996; *Redfronted Lemur*: Ostner & Kappeler 2004; *Rhesus Macaques*: MF Small & Smith 1985 **RODENT** *Mouse*: Weldon 1906 **UNGULATE** *Cattle*: Pearl 1917a*; Jewell 1921; *Deer*: Brohn & Robb 1955; Verme & Ozoga 1981:711; *Horse*: Darwin 1874*; Rasmussen 1940
Females more prevalent	**AMPHIBIAN** *Crocodile*: JW Lang 1989; *Frog*: McVey et al. 1981 (dart-poison frog); Donnelly 1989 (dart-poison frog); Prohl & Berke 2001 (dart-poison frog); Prohl 2002 (dart-poison frog); *Green Sea Turtle*: Meylan et al. 1990; Allard et al. 1994; *Hawksbill Sea Turtle*: Broderick et al. 1994; *Leatherback Sea Turtle*: Dutton et al. 1999; *Loggerhead Sea Turtle*: Bowen et al. 1993; *Mississippi Alligator*: JW Lang 1989; *Snapping Turtle*: Berry & Shine 1980; Kiviat 1980 **BIRD** *Blue Tit*: Kempenaers 1994; *Chicken*: Darwin 1874*; Heape 1907*; Pearl 1917b*; Jull 1924; Lambert & Curtis 1929; *Grackle*: McIlhenny 1940*; *Gulls*: RG Nager et al. 1999; *Zebra Finch*: von Engelhardt et al. 2004* (when mothers were treated with estradial) **INVERTEBRATE** *Ladybird Beetle*: Zakharov & Shaikevick 2001; *Diptera insect*: Hyde 1914; Warren 1918; Lawrence 1940; *Dog Tic*: E Rawls 1913; TH Morgan et al. 1925; Gershenson 1928; FC Bishopp & Smith 1938:21; *Several Parasitic Wasp Species*: WD Hamilton 1967 **PRIMATE (EXCEPT APE)** *Macaques*: JE Bowman & Lee 1995; *Spider Monkey*: CR Carpenter 1935; LL Klein & Klein 1977; Cant 1978; Symington 1987; CA Chapman & Chapman 1989 **REPTILE** *Lizard:* Cree et al. 1995* (when *Sphenodon gunteri* & *Sphenodon punctatus* eggs incubated at 18 degrees C); *Turtle*: D Crews et al. 1994* (when eggs incubated at 31 degrees C) **RODENT** *Guinea Pig*: Schott & Lambert 1930; *Hamster*: Labov et al. 1986; *Mouse*: Sumner et al. 1922; Bluhm 1924; Crew 1925; *Rabbit*: J Hammond 1934; *Rat*: King 1924* (wild rat); Rivers & Crawford 1974; Moriya & Hiiroshage 1978* (below normal temperature); Zamiri 1978; *Wood Lemming*: Maynard Smith & Stenseth 1978; Stenseth 1978 **UNGULATE** *Cattle*: Darwin 1874*; Maramatsu & Kawanishi 1975* (brown cattle); *Deer*: Wilckene 1886*; Lowe 1969; Verme 1969; *Pig*: Parkes 1923; *Saharan Arrui*: Cassinello & Gomendio 1996:1465; *Sheep*: Darwin 1874*; Wilckene 1886*; Johansson & Hansson 1943; Skjervold 1979

In most mammalian species, sex is basically determined genetically, but in some types of animals, environmental factors are largely responsible for whether an individual becomes a male or a female. Among amphibians, for example, males are hatched in greatest numbers when the temperature during incubation is "optimal", but when it becomes "too cold" or "too hot" (but still tolerable), increasingly higher proportions of the hatchlings are females (Freedberg & Wade 2003:178).

A series of studies are worth mentioning to further illustrate factors that influence secondary sex ratios. These studies involved a variety of ladybird beetle (ladybug) that inhabits much of Europe. In one study, nearly four-times as many females were being hatched as males even though earlier studies had found no significant differences in this species' secondary sex ratio. Investigations revealed that the adult females of this particular subpopulation of beetles (living near Stockholm, Sweden) had been infected by a "male-killing bacterium" which destroyed the male larva (Zakharov & Shaikevich 2001). Overall, many factors can have both short-term and long-term effects on secondary sex ratios.

1.1.1.4. Trends in the Sex Ratio at Birth

A few studies were located which reported on the proportion of males born over time. While all found that more males than females are still being born, some research has documented trends toward decreases in the proportion of males, while others have found increases (Table 1.1.1.4). Racial/ethnic factors may be linked to some of the seeming inconsistencies.

Table 1.1.1.4. Trends in the sex ratio at birth.

Nature of Any Difference	Citations
Increase in the proportion of males	**EUROPE** *Several European Countries*: Martuzzi et al. 2001 (1960-1995) **NORTH AMERICA** *United States*: Marcus et al. 1998* (1969-1995, Blacks); Nicolich et al. 2000 (1964-1988, non-Whites); D Smith & Von Behren 2005 (during 1980s & 1990s)
No signif difference	**NORTH AMERICA** *United States*: D Smith & Von Behren 2005 (during 1970s)
Decrease in the proportion of males	**EUROPE** *Denmark*: H Moller 1996 (1970 through 1980s) **NORTH AMERICA** *United States*: Marcus et al. 1998* (1969-1995, Whites); Nicolich et al. 2000 (1964-1988, Whites); D Smith & Von Behren 2005 (during 1960s) **INTERNATIONAL** *Several Industrialized Countries*: DL Davis et al. 1998 (1960 through early 1990s)

1.1.1.5. Sex Ratio Later in Life

The sex ratio later in life (or the tertiary sex ratio) refers to the proportion of males and females in a population beyond infancy. Split-Table 1.1.1.5 suggests considerable variations in the tertiary sex ratio for various species, including humans. However, as a general rule, among most populations of humans, the sex ratio reaches virtual equality in early adulthood. From then on, it begins to increasingly favor females, so that in elderly populations, there are nearly always more females than males (Jongbloet 2004:769). A major reason for the evening of the sex ratio despite more males than females being born is that males experience higher rates of death throughout childhood, adolescence, and much of adulthood. Evidence pertaining to the higher death rates of males will be presented in Chapter 3.

Split-Table 1.1.1.5. Sex ratio later in life.

Nature of Any Difference	Throughout Childhood	Young & Full Adults	Multiple Age Categories
More males	**AFRICA** *Kenya*: Ember 1973:426 (rural) **RODENT** *Marmot*: Allaine et al. 2000	**CANINE** *Wolf*: Sillero-Zubiri et al. 1996 **FISH** *Barbel*: Chenuil et al. 2004:129 **RODENT** *Gerbil*: Agren et al. 1989b; *Mole Rat*: Solomon & Getz 1997	
No signif difference			**EUROPE** *Hungary*: Kosa et al. 2002 (Roma Gypsy)
More females		**PRIMATE (EXCEPT APE)** *Baboons*: Seyfarth 1976; Bulger & Hamilton 1987; Henzi et al. 1999:241; *Redfronted Lemur*: Ostner & Kappeler 2004	**INTERNATIONAL** *Multiple Countries*: Metropolitan Life Insurance Co. 1949

1.1.1.6. Sex Ratio According to Uterine Location

According to one study, a greater proportion of male fetuses were carried in the right uterine horn and female fetuses in the left uterine horn among gerbils (Table 1.1.1.6).

Split-Table 1.1.1.6. Sex ratio according to uterine location.

Nature of Any Difference	Citation
More males	**RODENTS** *Gerbils*: MM Clark et al. 1990* (fetus in right uterine horn)
No signif difference	
More females	**RODENTS** *Gerbils*: MM Clark et al. 1990* (fetus in left uterine horn)

1.1.2. Natality Factors

Natality factors are those surrounding the process of birth. Variables to be considered will include such aspects as the length of gestation, miscarriage rates, and prenatal death.

1.1.2.1. Length of Gestation

The time between conception and birth is known as gestation length. Studies have reached inconsistent conclusions regarding any gender differences in gestation length (Table 1.1.2.1).

Table 1.1.2.1. Length of gestation.

Nature of Any Difference	Citations
Males longer	**EUROPE** *Britain*: Scheinfeld 1944:28*; *Germany*: A Scheinfeld 1944:28* **NORTH AMERICA** *United States*: Divon et al. 2002 (prolonged pregnancy) **BIRD** *Kestrel*: Blanco et al. 2003 (hatch later)
No signif. difference	**PRIMATE (EXCEPT APE)** *Rhesus Macaques*: DiGiacomo & Shaughnessey 1972; Bowman & Lee 1995; Bercovitch et al. 2000
Females longer	**EUROPE** *Britain*: Robertson 1923:47 **NORTH AMERICA** *United States*: NA Anderson & Brown 1943; de Zegher et al. 1999

1.1.2.2. Gestational Development, Rapidity of

The speed with which blastocysts, embryos, and fetuses add weight is referred to as the rapidity of gestational development. Table 1.1.2.2 shows that in all species yet studied, including humans, males develop more rapidly than do females.

Table 1.1.2.2. Gestational development, rapidity of.

Nature of Any Difference	Blastocyst Stage	Embryologic & Fetal Stages
Males more rapid	**RODENT** *Mouse*: Tsunoda et al. 1985 **UNGULATE** *Cattle*: B Avery et al. 1991*; KP Xu et al. 1992*	**EUROPE** *Britain*: FJ Pedersen 1980 **NORTH AMERICA** *United States*: PF Ray et al. 1995 **RODENT** *Mouse*: Burgoyne et al. 1995; *Rat*: WJ Scott & Holson 1977 **UNGULATE** *Cattle*: B Avery et al. 1991*; B Avery et al. 1992; Xu et al. 1992*; Yadav et al. 1993; Bredbacka & Bredbacka 1996
No signif. difference		
Females more rapid		

1.1.2.3. Pre-Term (Premature) Birthing and Other Birth Complications

Most studies of preterm birthing and birth complications indicate that these events are somewhat more common among males than females (Table 1.1.2.3).

Table 1.1.2.3. Pre-term (premature) birthing and other birth complications.

Nature of Any Difference	Premature Birthing
Higher for males	**EUROPE** *Britain*: DM Campbell & MacGillivray 1983; *Norway*: Vatten & Skjaerven 2004 **NORTH AMERICA** *United States*: Karn & Penrose 1951; Cooperstock & Campbell 1996 (Whites); BL Harlow et al. 1996; Cooperstock et al. 1997; Cooperstock et al. 1998* (White twins)
No signif. diff.	**NORTH AMERICA** *United States*: Cooperstock et al. 1998* (Black twins)
Higher for females	

1.1.2.4. Prenatal Death (Miscarriages)

According to Table 1.1.2.4, most research with humans as well as with other species indicates that male fetuses are considerably more likely than female fetuses to miscarry.

Table 1.1.2.4. Prenatal death (miscarriages).

Nature of Any Difference	Trimester			Anytime During Pregnancy
	During 1st Trimester			
Rates higher among males	**EUROPE** *Britain*: Hytten 1982; *Hungary*: Holmes & Goff 1923:247; *Vienna*: Holmes & Goff 1923:248* **NORTH AMERICA** *United States*: MM McMillen 1979*			**ASIA** *Japan*: Kajii et al. 1980 **EUROPE** *Belgium*: Bertillon 1875; *Britain*: FA Woods 1939 (Royal families); Dhadial et al. 1970; Hytten 1982; *Germany*: Auerbach 1912; Degenhardt & Michaelis 1977*; *Netherlands*: Wolda 1927 **LATIN AMERICA** *Cuba*: Heape 1908a **MIDDLE EAST** *India*: Premi 1991 **NORTH AMERICA** *Canada*: Wylie 1933; *United States*: Ciocco 1938; Ciocco 1940; Potter 1940; Scheindfeld 1944:35; Stevenson 1966; Mikamo 1969; Cavalli-Sforza & Bodmer 1971; Naeye et al. 1971; Machin & Crolla 1974; Creasy et al. 1976; G Sutherland et al. 1978; McMillen 1979*; Hassold et al. 1983; T Andrews et al. 1984; Gualtieri & Hicks 1985; Preti et al. 2000; L Ellis & Blanchard 2001:549 **BIRD** *Chicken*: Jull 1924; *Pheasant*: RH Thomas & Huxley 1927:238 **CANINE** *Dog*: Whitney 1939 **MAMMAL** *Multiple Species*: Crew 1927 **RODENT** *Hamster*: Sundell 1962; NC Pratt & Lisk 1989; *Rabbit*: Maurer & Foote 1971; *Rat*: HD King 1921 **UNGULATE** *Cattle*: JL Edwards et al. 2001:217 (due to heat stress); *Deer*: Robinette et al. 1957
No signif differ				**ASIA** *Japan*: Takahara et al. 1977 **EUROPE** *Sweden*: Lauritsen 1976
Rates higher among females	**EUROPE** *Germany*: Degenhardt & Michaelis 1977*; *Sweden*: Lauritsen 1976 **NORTH AMERICA** *United States*: Tietze 1948			**EUROPE** *France*: Boue 1967; Boue & Boue 1973; Boue et al. 1976; Hassold et al. 1980; Warburton et al. 1980; *Sweden*: Lauristen 1976 **MIDDLE EAST** *India*: Sudha & Rajan 1999 **NORTH AMERICA** *United States*: Warburton et al. 1980 **OCEANIA** *Hawaii*: Hassold et al. 1983:42 **BIRD** *Chicken*: Jull 1924

1.1.2.5. Perinatal Death (Stillbirth and Death of Infant)

Related to the concept of *miscarriage* is that of *stillbirths*. In fact, some studies of late-stage miscarriages might better be termed as stillbirths. Table 1.1.2.5 indicates that males exhibit higher rates of stillbirths and neonatal deaths than do females. The study conducted specifically on stillbirths found male stillbirths exceeding those for females at a rate of 135 to 100 (Herdan 1952:371).

Table 1.1.2.5. Perinatal death (stillbirth and death of infant).

Nature of Any Difference	Still Born	Death of Infant
More males	**EUROPE** *Sweden*: Herdan 1952:371	**NORTH AMERICA** *United States*: Ciocco 1940; Scheindfeld 1944:35; Scheindfeld 1944:32; Naeye et al. 1971 **MIDDLE EAST** *Pakistan*: Sathar 1987 **INTERNATIONAL** *Several Industrial Countries*: Mage & Donner 2004 **CANINE** *Dog*: Whitney 1939 **MAMMAL** *Multiple Species*: Crew 1927
No signif. difference		
More females		**ASIA** *Bangdadesh*: Fauveau et al. 1991

1.1.3. Neonatal Physiological Features

Neonatal physiological features primarily have to do with the birth weights and lengths of newborns.

1.1.3.1. Fetal Weight

The limited research on fetal weight suggests that there are few if any sex differences for fetuses and comparable stages in gestation. One study shown in Table 1.1.3.1 indicated that male fetuses weighed more, while the remaining two studies found no significant differences.

Table 1.1.3.1. Fetal weight.

Nature of Any Difference	Citations
Higher in males	**EUROPE** *Britain*: Pedersen 1980
No significant difference	**ASIA** *Japan*: Tezuka et al. 1998 **EUROPE** *Britain*: Selbing & McKay 1985
Higher in females	

1.1.3.2. Birth Weight

Many studies have investigated gender differences in birth weight. Across all species yet studied, including humans, studies have found males averaging greater weight at delivery than females (Table 1.1.3.2).

Table 1.1.3.2. Birth weight.

Nature of Any Difference	Citations
Higher in males	**AFRICA** *South Africa*: N Cameron et al. 1998:499 **ASIA** *Japan*: Miwa in TB Robertson 1923:474**;** *Russia*: Tschepourkovsky in TB Robertson 1923:474; V Vickers & H Stuart 1943:155 **EUROPE** : *Britain*: K Pearson 1900; Pearson in TB Robertson 1923:474; Tully et al. 2004:220 (twins); *Denmark*: Heiberg in TB Robertson 1923:474; *Finland*: Taittonen et al. 1996:628; *France*: Guihard-Costa et al. 2002:30 **MIDDLE EAST** *Lebanon*: Usta & Nassar 2004:196 **NORTH AMERICA** *United States*. Evetzky 1881; Stockton-Hough 1885; WH Morse 1886:393; CW Townsend 1887; LE Holt 1897; Hrdlicka 1898; Hollingsworth & Montague 1914; Bowditch in TB Robertson 1923:474; NA Anderson & Brown 1943; LM Terman & Tyler 1954; HJ Hoffman et al. 1974; AJ Parker et al. 1984 (intrauterine growth rate); Marsal et al. 1996 (intrauterine growth rate); TB Gage & Therriault 1998:518; de Zegher et al. 1999 **OCEANIA** *Australia*: TB Robertson 1923:474 **BIRD** *Great Reed Warbler*: Nishiumi et al. 1996; Westerdahl et al. 1997; *Yellow-Headed Blackbird*: CB Patterson et al. 1980 **PRIMATE (EXCEPT APE)** *Baboon*: McMahon et al. 1976; *De Brazza's Monkey*: Valerio & Dalgard 1975; *Long-Tail Macaque*: Dang et al. 1992; *Orangutans*: A Seitz 1969; *Rhesus Macaque*: DiGiacomo & Shaugnessy 1972; Riopelle & Hale 1975; ES Watts 1977; Bercovitch et al. 2000 **UNGULATE** *Cattle*: Behboodi et al. 2001:33; *Deer*: Espmark 1971; Robinette et al. 1973; Nowosad 1975; McCullough 1979
No signif. difference	**PRIMATE (EXCEPT APE)** *Long-tailed Macaque*: Willes et al. 1977; *Pig-tailed Macaque*: Willes et al. 1977
Higher in females	

1.1.3.3. Birth Weight Depression

According to two studies, male birth weight is depressed more than female birth weight among babies whose mothers experience persistent oxygen deprivation in the Andes of Bolivia (Table 1.1.3.3).

Table 1.1.3.3. Birth weight depression.

Nature of Any Difference	Citations
Male weight depressed more	**LATIN AMERICA** *Bolivia*: Haas 1976 (due to high altitude); Hass et al. 1980 (due to high altitude)
No significant difference	
Female weight depressed more	

1.1.3.4. Birth Weight, Individual Variability in

One study that investigated variability in birth weight concluded that males exhibited greater variability than did females, while the other study concluded that there were no significant sex differences (Table 1.1.3.4).

Table 1.1.3.4. Birth weight, individual variability in.

Nature of Any Difference	Citations
Males exhibit more	**EUROPE** *Britain*: BT Baldwin 1923:27
No significant difference	**NORTH AMERICA** *United States*: Hollingsworth & Montague 1914
Females exhibit more	

1.1.3.5. Birth Length

Most research concerning gender differences in the length of babies at birth have concluded that baby boys are longer than baby girls. The earliest study to be conducted (in the late 1800s) failed to find a statistically significant difference (Table 1.1.3.5).

Table 1.1.3.5. Birth length.

Nature of Any Difference	Citations
Males longer	**EUROPE** *Britain*: K Pearson 1900; *Several European Countries*: TB Robertson 1923:476 **NORTH AMERICA** *United States*: Hollingsworth & Montague 1914
No significant difference	**NORTH AMERICA** *United States*: LE Holt 1897
Females longer	

1.1.3.6. Birth Length, Individual Variability in

One study of variability in birth length found greater variability among the males than was true for the females (Table 1.1.3.6).

Table 1.1.3.6. Birth length, individual variability in.

Nature of Any Difference	Citations
Males more variable	**EUROPE** *Britain*: BT Baldwin 1923:27
No significant difference	
Females more variable	

1.1.4. Reproductive and Genetic Factors

As the concept is being used here, reproductive factor are those having to do with fertility, which is usually measured in terms of the number of offspring individuals or couples have. Also considered in this section will be studies pertaining to genetic differences between the sexes.

1.1.4.1. Spacing Between Offspring (Birth Spacing)

Some studies have investigated the possibility that the spacing between births might vary depending upon the sex of the preceding child. The rationale behind these studies surrounds the observation that in most countries couples prefer having boys over girls (see Chapter 12). Therefore, couples would be expected to delay having additional children more once they had given birth to a boy. As shown in Table 1.1.4.1, the evidence at this point is mixed with regard to this line of reasoning.

Table 1.1.4.1. Spacing between offspring (birth spacing).

Nature of Any Difference	Citation
Longer after males	**AFRICA** *Kenya*: Mace & Sear 1997 (pastoralist tribe) **ASIA** *Vietnam*: Swenson & Thang 1993
No signif difference	
Longer after females	**NORTH AMERICA** *United States*: Margulis et al. 1993 (Hutterites)

1.1.4.2. Reproductive Success/Fertility, Individual Variability in

In terms of the total number of offspring had, the sexes must be exactly equal, since every offspring in a sexually reproducing species must have a mother and a father. However, there remains the possibility that one sex can exhibit greater variability in producing offspring than the other sex.

The concept of *reproductive success* (*RS*) is central to the Darwinian evolutionary theory. While the term is conceptually simple – i.e., the number of copies of an individual's genes found in subsequent generations – precisely measuring it can be difficult (Ellis 1995:261). Obstacles to precise measurement of RS include the fact that that the concept does not simply mean the number of offspring an individual produces but the number of offspring those offspring produce as well, etc. This indicates that the most exact measure of RS would require researchers to follow an individual's progeny over a multitude of generations. Another aspect of RS that makes it difficult to measure comes from noting that an individual's genes can be passed on to future generations not only by having offspring oneself, but also by helping close relatives bear and rear offspring. This is because close relatives also carry many of the same genes as do a given individual.

Added to the above nuances in the concept of RS difficulties is the fact that in most species, RS is easier to measure in females than in males. This is especially true because females are better equipped than males to identify and to bond with their offspring immediately after giving birth. With these stipulations in mind, one can see from Table 1.1.4.2 that the evidence largely suggests that males exhibit greater variability in RS than is true for females.

Table 1.1.4.2. Reproductive success/fertility, individual variability in.

Nature of Any Difference	Citations
Males more varied	**AFRICA** *South Africa*: Howell 1979 (!Kung tribe) **LATIN AMERICA** *Columbia*: Zaldivar et al. 1991:485 (Bari, due to polygamy); *Paraguay*: K Hill & Hurtado 1996 (Ache) **NORTH AMERICA** *Canada*: Greenglass 1993:981 (managers); *United States*: Laumann 1994:444; TJ Hoff 2004:306 (doctors) **AMPHIBIAN** *Frog*: Prohl & Hodl 1999 **MAMMAL** *Gray Seal*: SS Anderson & Fedak 1987; Godsell 1991; Lidgard et al. 2001 **REPTILE** *Lizard*: Trivers 1972
No signif. difference	**AFRICA** *South Africa*: Draper & Hames 2000:144
Females more varied	**BIRD** *Spotted Sand Piper*: Oring et al. 1991 (upper range variability)

1.1.4.3. Relationship Between Age and Reproductive Success

One study among birds concluded that there was a stronger positive relationship between age and annual reproductive success in males than in the case of females (Table 1.1.4.3).

Table 1.1.4.3. Relationship between age and reproductive success.

Nature of Any Difference	Citations
Stronger for males	**BIRD** *Cassin's Auklets*: Pyle et al. 2001 (annual RS)
No signif difference	
Stronger for females	**BIRD** *Bowerbirds*: Vellenga 1980 (reproducing at younger age); *Peacocks*: JT Manning 1989 (reproducing at younger age)

1.1.4.4. Relationship Between Aggression and Reproductive Success

According to one study, aggressive tendencies were more strongly related to the reproductive success of males than to that of females (Table 1.1.4.4). In other words, the most aggressive males sired the most offspring, whereas for females, aggression had less to do with offspring produced.

Table 1.1.4.4. Relationship between aggression and reproductive success.

Nature of Any Difference	Citation
Stronger for males	**AMPHIBIAN** *Anolis Corolinensis*: TA Jenssen & Nunez 1998
No signif difference	
Stronger for females	

1.1.4.5. Genetic Contributions to the Body Mass Index

The body mass index (BMI) has been shown to be heritable, meaning that genes play a sizable role in determining how heavy one will be after controlling for height (Pietilainen et al. 1999). These studies were designed to assess the extent to which genetics contributes to one's BMI. As shown in Table 1.1.4.5, the findings have been inconsistent regarding an sex difference in this regard.

Table 1.1.4.5. Genetic contributions to the body mass index.

Nature of Any Difference	Prepubertal				Postpubertal	
				Childhood	Adolescent	Adult
More in males					**EUROPE** *Finland*: Korkeila et al. 1991 (twins)	**NORTH AMERICA** *United States*: Stunkard et al. 1990 (twins reared apart)
No signif. difference					**EUROPE** *Finland*: Pietilainen et al. 1999* (17 year olds)	
More in females				**EUROPE** *England*: Brook et al. 1975	**EUROPE** *Finland*: Pietilainen et al. 1999* (16 year olds)	**EUROPE** *Germany*: Neals & Cardon 1992 (twins); *Norway*: Harris et al. 1995 (twins) **NORTH AMERICA** *United States*: DB Allison et al. 1994 (twins)

1.1.4.6. Genetic Contributions to Development

One study indicated that the IGF-1 gene promoted the growth of males more than the growth of females (Table 1.1.4.6).

Table 1.1.4.6. Genetic contributions to development.

Nature of Any Difference	Citation
Males more	**EUROPE** *Netherlands*: Rietveld et al. 2004 (height promoted by the IGF-1 gene)
No signif difference	
Females more	

1.1.4.7. Genetic Mutations

Two studies have indicated that males exhibit greater DNA damage in their rectal cells than do females (Table 1.1.4.7).

Table 1.1.4.7. Genetic mutations.

Nature of Any Difference	Citation
More in males	**EUROPE** *Germany*: Pool-Zobel et al. 1999 (greater DNA damage in rectal cells); Pool-Zobel et al. 2004 (greater DNA damage in rectal cells)
No signif difference	
More in females	

1.1.4.8. SRY Gene

SRY is a gene located on the Y chromosome. It begins the biochemical cascading process that causes the undifferentiated gonad to develop into a testis. As such, the SRY gene is essentially exclusive to males, a fact documented in one study presented in Table 1.1.4.8.

Table 1.1.4.8. SRY gene.

Nature of Any Difference					Postpubertal
					Adult
More in males					**EUROPE** *Germany*: Mayer et al. 1998 (hypothalamus, frontal cortex, temporal cortex)
No signif. difference					
More in females					

1.1.4.9. ZFY Gene

Like the SRY gene (see above), the ZFY gene is located on the Y chromosome and it is found almost exclusively among genetic males (Table 1.1.4.9).

Table 1.1.4.9. ZFY gene.

Nature of Any Difference					Postpubertal
					Adult
More in males					**EUROPE** *Germany*: Mayer et al. 1998 (hypothalamus, frontal cortex, temporal cortex)
No signif. difference					
More in females					

1.1.5. Maturation and Development

The sex differences subsumed maturation and development have to do with the rate at which males and females progress through various key physiological stages of life, with the onset of puberty being a particularly significant one.

1.1.5.1. Physical Maturation Rate in Utero

According to one study, fetal physical maturation occurs more rapidly among females than among males (Table 1.1.5.1).

Table 1.1.5.1. Physical maturation rate in utero.

Nature of Any Difference	Citation
More rapid in males	
No signif difference	
More rapid in females	**EUROPE** *Belgium*: M Lampl & Jeanty 2003 (opposite-sex twins)

1.1.5.2a. Physical Maturation Rate Following Birth

Physical maturation rates are assessed in various ways depending in part on the age and the species of the subjects. For sub-adolescents, assessment usually involves measures of the rate of skeletal growth. The studies summarized by Table 1.1.5.2 pertaining to humans indicates that females mature more rapidly than do males. This is consistent with a meta-analysis performed on prepubertal humans regarding the rapidity with which both sexes develop through various key behavioral milestones, such as walking and talking (Cohn 1991).

Table 1.1.5.2. Physical maturation rate following birth.

Nature of Any Difference	Prepubertal				Postpubertal	
	Infant	Toddler	Early Child.	Childhood	Adolescent	Adult
More rapid in males						
No signif. difference				**EUROPE** *Croatia*: M Zivicnjak et al. 2003 (until 9 years old)		
More rapid in females	**NORTH AMERICA** *United States*: A Scheinfeld 1944:27 (skeletal development); Darley & Winitz 1961 (speech organs); Eichorn 1968 (skeletal development); Held et al. 1984 (4-9 month olds, vernier acuity); Bauer et al. 1986 (4-9 moth olds, binocularity)	**NORTH AMERICA** *United States*: Mead 1913; Flory 1935*; Bayley 1940 (bone development); Bayley 1943 (skeletal development); Kagan & Lewis 1965	**NORTH AMERICA** *United States*: Flory 1935* (skeletal development)	**NORTH AMERICA** *United States*: Beik 1913; Baldwin 1922; Flory 1935* (skeletal development); A Scheinfeld 1944:46 (skeletal development)	**EUROPE** *Britain*: Tanner 1966 (height velocity) **NORTH AMERICA** *Canada*: AM Thompson et al. 2003:1688 (height velocity); *United States*: Baldwin 1922; Flory 1935* (skeletal development); Tanner et al. 1966*; Tanner et al. 1976	**EUROPE** *Britain*: LT Higgins et al. 2002:87 (sexual maturity, college) **NORTH AMERICA** *United States*: Hutt 1972 (young)

1.1.5.2b. Physical Maturation Rate Following Birth Among Nonhumans

Unlike the research with humans, the limited findings from nonhumans indicate that males mature more rapidly than do females (Table 1.1.5.2b).

Table 1.1.5.2b. Physical maturation rate following birth among nonhumans.

Nature of Any Difference						Postpubertal	Multiple Age Categories
						Adult	
More rapid in males						**RODENT** *Rat*: Varma & Meguid 2001:399 (growth in weight)	**INVERTEBRATES** *Mealworm*: Hein 1920:240 (growth in length)
No signif. difference							
More rapid in females							

1.1.5.3. Onset of Puberty, Age at

The *onset of puberty* is usually marked by various physical changes. In females, it begins with the first menstruation (known as *menarche*). In males, the voice begins to lower, and in both sexes the growth of pubic hair begins. Even though different types of measures for the onset of puberty are used for males and females, one can see from Table 1.1.5.3 that all studies agree that females begin exhibiting signs of puberty earlier than is the case for males. Most studies have found the difference to be about 1.5 years (Sheehy et al. 1999).

Table 1.1.5.3. Onset of puberty, age at.

Nature of Any Difference	Citation
Earlier in males	
No signif difference	
Earlier in females	**EUROPE** *Britain*: Tanner et al. 1976; *Finland*: Kaltiala-Heino et al. 2003:537; *Germany*: Largo et al. 1978; Sheehy et al. 1999; *Norway*: Storvoll & Wichstrom 2002:190 (self-reports); *Sweden*: Lindgren 1978 **NORTH AMERICA** *Canada*: Marcotte 2002; *United States*: Flory 1935; Willoughby 1935; AC Petersen & Crockett 1985; Sagrenstano et al. 1999:100 (Blacks); Offer et al. 1996

1.1.5.4. Timing of Pubertal Growth Spurt

Studies have consistently found that the timing of the pubertal growth spurt is earlier in females than it is in males (Table 1.1.5.4).

Table 1.1.5.4. Timing of pubertal growth spurt.

Nature of Any Difference	Citation
Earlier in males	
No signif difference	
Earlier in females	**ASIA** *Japan*: Ashizawa 1970; JM Tanner et al. 1982; Ali & Ohtsuki 2000; Ali et al. 2000 **EUROPE** *Britain*: JM Tanner et al. 1976; Dangour et al. 2002:294 (adolescent growth spurt onset); *Poland*: Bielicki 1975; Bielicki et al. 1984; *Sweden*: Karlberg 1989 **NORTH AMERICA** *United States*: Ledford & Cole 1998 **OCEANIA** *Australia*: T Brown & Townsend 1982 (aborigines)

1.2

MORPHOLOGY AND PHYSIOLOGY

Morphology refers to all aspects of an animal's physical appearance or external anatomy. Some of the most widely investigated morphological traits regarding possible sex differences have to do with body size, height, and weight. Others involve body proportion. Results of these investigations are summarized below.

1.2.1. Body Size, Height, and Weight

Many studies have sought to assess the extent to which males and females differ in body size. The findings are summarized below.

1.2.1.1a. Height Among Prepubertal Humans

Because a tremendous amount of research is available on gender differences in height, the findings are presented in four tables: one each for prepubertals, young adolescents, and older adolescents and adults. Regarding prepubertal humans, the evidence fails to be consistent in indicating which gender is taller although for infants, all except one study suggest that, on average, males surpass females in height. For toddlers and preschool children, most studies have concluded that males are taller or that there are no significant differences. Among school age children (roughly ages 6-11), the results become even more mixed (Split-Table 1.2.1.1a).

Split-Table 1.2.1.1a. Height among prepubertal humans.

Nature of Any Difference	Infant	Toddler	Early Childhood	Childhood
Males taller	**AFRICA** *South Africa*: N Cameron et al. 1998:499* **NORTH AMERICA** *United States*: Stockton-Hough 1885 (19th Century); GM West 1893; DB Gardner & Swigerm 1958 (adoptees); J Bernard 1964 (adoptees)	**AFRICA** *South Africa*: N Cameron et al. 1998:499*	**AFRICA** *South Africa*: N Cameron et al. 1998:499* **EUROPE** *Britain*: Habbukuk 1926*; Dangour et al. 2002*; *Scotland*: Elderton 1914* **LATIN AMERICA** *Peru*: de Meer et al. 1993:66 **NORTH AMERICA** *Canada*: F Boas 1897*; *United States*: F Boas 1897*	**EUROPE** *Britain*: Kuh et al. 1991; Dangour et al. 2002*; *Scotland*: Elderton 1914* **NORTH AMERICA** *United States*: Bowditch 1872 (19th Century)*; Anonymous 1893:41 (19th Century); JA Gilbert 1893:91 (19th Century); WT Porter 1892:180 (19th Century)*; Roche & Malina 1983:204; Perry et al. 2001:2992*; Bogin et al. 2002 (Hispanic)
No signif. difference		**EUROPE** *France*: Variot & Chaumet cited in TB Robertson 1923:503*	**ASIA** *Japan*: Hashiga cited in TB Robertson 1923:503* **EUROPE** *France*: Variot & Chaumet cited in TB Robertson 1923:503* **NORTH AMERICA** *United States*: Perry et al. 2001:2992* **OCEANIA** *Philippines*: Bobbit cited in TB Robertson 1923:503*	**ASIA** *Japan*: Hashiga cited in TB Robertson 1923:503* **EUROPE** *Austria*: Kirchengast & Steiner 2001; *Britain*: British Board of Health cited in Robertson 1923:502*; *France*: Variot & Chaumet cited in TB Robertson 1923:503*; *Germany*: Gasser et al. 2000*; *Italy*: Pagliani cited in TB Robertson 1923:503* **NORTH AMERICA** *Canada*: F Boas 1897*; AM Thompson et al. 2003:1686; *United States*: GM West 1893:4 (19th Century); F Boas 1897*; Malina et al. 1973; Perry et al. 2001:2992* **OCEANIA** *New Zealand*: EC Rush et al. 2003:4; *Philippines*: Bobbit cited in TB Robertson 1923:503*
Females taller	**NORTH AMERICA** *United States*: LE Holt 1897 (19th Century)*	**NORTH AMERICA** *United States*: LE Holt 1897 (19th Century)*		**ASIA** *Japan*: Satake et al. 1995 **EUROPE** *Sweden*: Lindgren 1978* **OCEANIA** *Australia*: Magarey et al. 1999:140*; *Fiji & Samoa*: Satake et al. 2001:276* (late childhood)

1.2.1.1b. Height Among Young Adolescent Humans

Studies for height among young adolescent humans are mixed with nearly equal amounts showing either females to be taller or no significant difference between males and females. Only one study in Split-Table 1.2.1.1b indicates that young male adolescents are taller than the females of the same age.

Split-Table 1.2.1.1b. Height among young adolescent humans.

Nature of Any Difference	Young Adolescent
Males taller	**NORTH AMERICA** *United States*: Perry et al. 2001:2992*
No signif. difference	**ASIA** *China*: AM McManus et al. 2004:603; *Japan*: Hashiga cited in TB Robertson 1923:503*; Kouda et al. 2003:1107; Kouda et al. 2004:80 **EUROPE** *Britain*: British Board of Health cited in Robertson 1923:502*; *France*: Variot & Chaumet cited in TB Robertson 1923:503*; *Italy*: Pagliani cited in TB Robertson 1923:503*; *Scotland*: Elderton 1914; *Sweden*: Key cited in TB Robertson 1923:503* **NORTH AMERICA** *Canada*: AM Thompson et al. 2003:1686; *United States*: GF Peckham 1881:61 (19th Century); Holt cited in Robertson 1923:502*; Roche & Malinal 1983:204 **OCEANIA** *Philippines*: Bobbit cited in TB Robertson 1923:503*
Females taller	**ASIA** *Japan*: Satake et al. 1995 **EUROPE** *Britain*: Dangour et al. 2002; *Croatia*: M Zivicnjak et al. 2003; *Germany*: Gasser et al. 2000* *Sweden*: Lindgren 1978* **NORTH AMERICA** *Canada*: F Boas 1897*; *United States*: Bowditch 1872; JM Greenwood 1891*; WT Porter 1892:180*; Anonymous 1893:41; JA Gilbert 1893:91; JA Gilbert 1894*; F Boas 1897*: JA Gilbert 1897*; WW Hastings 1900; FW Smedley 1902; Holt cited in Robertson 1923:502*: Perry et al. 2001:2992* **OCEANIA** *Fiji & Samoa*: Satake et al. 2001:276*

1.2.1.1c. Height Among Older Adolescents

Split-Table 1.2.1.1c continues to present findings for humans concerning gender differences in height. Unlike the research based on sub-adolescents and young adolescents, by late adolescence (i.e., following age 15), male height, on average, consistently surpasses that of females (TB Robertson 1923:503; JP Gray & Wolfe 1980; Guegan et al. 2000:2529).

Split-Table 1.2.1.1c. Height among older adolescent humans.

Nature of Any Difference	Older Adolescent
Males taller	**ASIA** *China*: AM McManus et al. 2004:603; *Japan*: Ali et al. 2001; Kouda et al. 2003:1107 **EUROPE** *Britain*: British Board of Health cited in Robertson 1923:502*; Hauspie et al. 1985*; Dangour et al. 2002; *Denmark*: Roepstorff et al. 2002:E43b (young); *Finland*: Pietilainen et al. 1999 (16-17 year olds); *France*: Variot & Chaumet cited in TB Robertson 1923:503*; *Germany*: Gasser et al. 2000*; *Italy*: DeVito et al. 1999:651*****; *Sweden*: Lindgren 1978* **MIDDLE EAST** *India*: Hauspie et al. 1985*; *Turkey*: Tan. 2003: 1352 (older adolescents) **NORTH AMERICA** *Canada*: F Boas 1897*; AM Thompson et al. 2003:1686*; *United States*: Bowditch 1872 (19th Century)*; GF Peckham (19th Century) 1881:61 (19th Century); JM Greenwood 1891 (19th Century)*; JA Gilbert 1893:91 (19th Century); JA Gilbert 1894 (19th Century)*: F Boas 1897*; JA Gilbert 1897 (19th Century)*; Holt cited in Robertson 1923:502*; Krogman 1970; Hamill et al. 1973; Malina et al. 1974; Roche & Malina 1983:204 **OCEANIA** *Australia*: Magarey et al. 1999:140* (after age 15); *Philippines*: Bobbit cited in TB Robertson 1923:503*
No signif. difference	
Females taller	

1.2.1.1d. Height Among All Adult Humans

As shown in Split-Table 1.2.1.1d, all studies of adults have concluded that males are taller on average than females.

Split-Table 1.2.1.1d. Height among all adult humans.

Nature of Any Difference	Adult	Multiple Age Categories
Males taller	**AFRICA** *Egypt*: Valsik et al. 1970 (Nubians); *Fiji*: Clegg 1989; *Mongolia*: Vlcek 1965; *South Africa*: Shapira 1930 (Hottentots tribe); Brauer 1982 (!Kung tribe); Tobias 1989 (Bantu); *Tanzania*: Sellen 1995 (Maasai tribe); *West Africa*: Prazuck et al. 1988 (Fulani & Mossi); *Sub-Saharan Africa*: Rattray 1923:332 (Ashanti Tribe); Orr & Gilks 1931:77 (various tribes); Hiernaux 1968 (various tribes); Holden & Mace 1999 (various tribes) **ASIA** *Hong Kong*: Luo et al. 1999*; Lei et al. 2004:73 (elderly); *Russia*: Smirnova 1979 (Siberians); W Leonard et al. 1996 (Siberia); *Taiwan*: Chai 1967; *Several Asian Countries*: K Kennedy 1984 (Neolithic Asia **EUROPE** *Britain*: Annandale & Hunt 1990:35; AH Baker & Wardle 2003; *Denmark*: AN Pedersen et al. 2002 (elderly, 80 years old); *Finland*: Auger et al. 1980; Rosenbaum et al. 1985; Geelen et al. 2002:1403; *France*: Ochala et al. 2004:442 (elderly); *Germany*: G Shan & Bohn 2003* (young); *Ireland*: Hooton et al. 1955; *Italy*: DeVito et al. 1999:651***** (young); Perissinotto et al. 2002 (elderly); *Norway*: HE Meyer & Selmer 1999:221; *Sweden*: Luo et al. 1999*; *Several European Countries*: RB Bean 1923:8 (young); Meiklejohn et al. 1984 (Neolithic Europe); deGroot et al. 1991 (elderly); Dey et al. 1999 (elderly) **LATIN AMERICA** *Brazil*: Neves et al. 1985; Stinson 1990; *Columbia*: Steggerda 1963; *Guiana*: Gillin 1936; *Mexico*: McCullough 1982 (Maya); *Peru*: Benfer 1984 (~5000 yrs ago); *Several South American Tribes*: Steggerda 1963; *Several Latin American Countries*: Comas 1971 **MIDDLE EAST** *India*: H Field 1970; Ganguly 1979; *Iran*: Ayatollahi & Carpenter 1993; *Saudi Arabia*: Khalid 1995; *Lebanon*: P Smith et al. 1984 (Late Paleolithic Levant) **NORTH AMERICA** *Canada*: Jenness 1923; Birkbeck & Lee 1973 (Nootka people); Auger et al. 1980; Ledoux st al. 1997; Marliss et al. 2000:458 (young); *United States*: Hrdlicka 1935 (Pueblos, Navajo); RL Jackson & Kelly 1945; Skeller 1954 (Alaska Inuit); P Miller 1970 (Apache Indians); WM Moore 1972 (Navajo Indians); DC Cook 1984 (pre-Columbian); AH Goodman et al. 1984 (pre-Columbian); CS Larsen 1984 (pre-Columbian, ~3000 yrs ago); Perzigian et al. 1984 (pre-Columbian, ~3000 yrs ago); Comuzzie et al. 1993:730 (Mexican Americans); Kwo et al. 1998:1554 (young); al'Absi et al. 1999:334; Jantz & Jantz 1999; Pritzlaff et al. 1999 (men taller); Nopoulos et al. 2000; AS Jackson et al. 2002:791; Treiber et al. 2002:709; Karasik et al. 2003:311; Shan & Bohn 2003* (young); Nicolay & Walker 2005:607 **OCEANIA** *Australia*: MJ Barrett & Brown 1971 (aborigines); Pretty et al. 1998; Duan et al. 2001:2271; A Wright et al. 2002:286 (young); *New Guinea*: Wolstenholme & Walsh 1967; LA Malcolm 1969; BH Heath & Carter 1971; Littlewood 1972; Hyndman et al. 1989; Ulijaszek 1993; *Solomon Islands*: LB Page et al. 1977; *Tokelau Island*: Prior et al. 1977 **INTERNATIONAL** *Multiple countries*: Murdock & White 1969 (73 out of 73 countries); Eveleth & Tanner 1976; Gray & Wolfe 1980; Guegan et al. 2000	**ASIA** *Japan*: Satake et al. 1995 **EUROPE** *Britain*: Bjelke 1971; RR Baker & Bellis 1993:872; Formicola 1993:355 (Neolithic skeletal remains); *Sweden*: Kuskowska-Wolk et al. 1991 **LATIN AMERICA** *Mexico*: Steggerda 1941:154 (ancient Mayan skeletal remains); TD Steward 1953:299 (ancient Mayan skeletal remains); WA Haviland 1967 (ancient Mayan skeletal remains) **NORTH AMERICA** *United States:* AS Pierson et al. 1974; D Miller 1990 **OCEANIA** *Fiji*: Satake et al. 2001:276*; *Samoa*: Satake et al. 2001:276* **HOMINID** *Australopithecus*: Wolpoff 1980 (fossils); Aiello 1994 (fossils); MG Leakey et al. 1995 (fossils); Richmond & Jungers 1995 (fossils); MG Leakey et al. 1998 (fossils)
No signif. difference		
Females taller		

1.2.1.2. Height/Length, Individual Variability in

Studies that have sought to determine if males or females exhibit greater variability in height have been confined to adolescents and adults. Table 1.2.1.2 shows that all studies have documented greater variability among males than among females.

Table 1.2.1.2. Height/length, individual variability in.

Nature of Any Difference						Postpubertal	Multiple Age Categories
						Adult	
Males more varied						**EUROPE** *Netherlands*: Roede & van Wieringen 1985; Fredriks et al. 2000; Rietveld et al. 2004:196	**EUROPE** *Britain*: Acheson & Fowler 1964 **NORTH AMERICA** *United States*: Froelich 1970 (Hawaii, adult) **INTERNATIONAL** *Multiple countries*: Formicola 1993:355 (European Neolithic skeletons) **INSECT** *Mealworms*: Hein 1920:240
No signif. difference							
Females more varied							

1.2.1.3. Sitting Height (Length of Trunk)

To measure sitting height, subjects are asked to sit in a chair while the researcher measures the distance from the chair's seat to the top of each subject's head. Studies in Table 1.2.1.3 have come to conflicting conclusions regarding any sex difference in sitting height, with the possible exception of studies in late adolescence and adulthood, where males appear to be taller in sitting height.

Table 1.2.1.3. Sitting height (length of trunk).

Nature of Any Difference	Prepubertal				Postpubertal		
	Infant	Toddler	Early Child.	Childhood	Adolescent		Adult
					Early	Late	
Male trunk length longer		**EUROPE** *Germany*: Gasser et al. 2000*				**EUROPE** *Belgium*: Koziel et al. 1995; *Britain*: Hauspie et al. 1985; Dangour et al. 2002* **OCEANIA** *Fiji & Samoa*: Satake et al. 2001:276*	**EUROPE** *Germany*: G Shan & Bohn 2003* (young) **NORTH AMERICA** *United States*: G Shan & Bohn 2003* (young)
No signif. difference	**NORTH AMERICA** *United States*: Stockton-Hough 1885; GM West 1893		**EUROPE** *Germany*: Gasser et al. 2000*	**OCEANIA** *Fiji & Samoa*: Satake et al. 2001:276*	**OCEANIA** *Fiji & Samoa*: Satake et al. 2001:276*		
Female trunk length longer					**EUROPE** *Britain*: Dangour et al. 2002* **NORTH AMERICA** *United States*: FW Smedley 1902:58		

1.2.1.4a. Weight Among Prepubertal Humans

To accommodate the large number of studies, the table on sex differences in weight has been split, with one portion pertaining to prepubertals and the other pertaining to adolescents and adults. Numerous studies have assessed sex differences in weight among prepubertals. As shown in Split-Table 1.2.1.4a, most studies have shown that males weigh more than females throughout childhood.

Split-Table 1.2.1.4a. Weight among prepubertal humans.

Nature of Any Difference	Prepubertal			
	Infant	Toddler	Early Childhood	Childhood
Males weight more	**AFRICA** *South Africa*: N Cameron et al. 1998:499* (75% Blacks) **NORTH AMERICA** *United States*: Stockton-Hough 1885 (19th century); GM West 1893; Almli et al. 2001:257 (in utero & neonate)	**AFRICA** *South Africa*: N Cameron et al. 1998:499* (75% Blacks) **ASIA** *China*: Tam et al. 1999:510 **EUROPE** *France*: Variot & Chaumet cited in JA Robertson 1923:501* **NORTH AMERICA** *United States*: LE Holt 1897* (19th Century)	**AFRICA** *South Africa*: N Cameron et al. 1998:499* (75% Blacks) **ASIA** *Japan*: Miwa in JA Robertson 1923:501*; Miwa in TB Robertson 1923:501 **EUROPE** *Britain*: Habbukuk 1926*; *Italy*: Pagliani in Robertson 1923:501* **NORTH AMERICA** *United States*: Holt in TB Robertson 1923:500*; Porter cited in TB Robertson 1923:500*	**ASIA** *Japan*: Miwa cited in JA Robertson 1923:501* **EUROPE** *Italy*: Pagliani cited in Robertson 1923:501*; *Scotland*: TJ Cole et al. 2000; *Sweden*: Key cited in Robertson 1923:501* **NORTH AMERICA** *Canada*: F Boas & Wissler 1897*; *United States*: F Boas & Wissler 1897*; Holt cited in TB Robertson 1923:500*; Porter cited in TB Robertson 1923:500*; McNemar & Terman 1936:24*; Roche & Malina 1983:204*; Perry et al. 2001:2992*
No signif. difference	**NORTH AMERICA** *United States*: LE Holt 1897* (19th Century); DG Gardner & Swiger 1958 (adoptees)		**NORTH AMERICA** *United States*: Perry et al. 2001:2992*	**EUROPE** *Austria*: Kirchengast & Steiner 2001; *Britain*: Habbukuk 1926* **LATIN AMERICA** *Dominican Republic*: MV Flinn et al. 1999:469*; Gabbard & Tandy 1988:155
Females weight more				**OCEANIA** *Australia*: Magarey et al. 1999:140 (age 11); *New Zealand*: EC Rush et al. 2003:3; *Philippines*: Bobbit in TB Robertson 1923:501*

1.2.1.4b. Weight among Human Adolescents and Adults

Among adolescents and adults, numerous studies show that males weigh more except in early-to-middle adolescents, when the findings have been inconsistent (Split-Table 1.2.1.4b). This presumably reflects the fact that females begin puberty a year or two earlier than do males.

Split-Table 1.2.1.4b. Weight among human adolescents and adults.

Nature of Any Difference	Postpubertal			Multiple Age Categories
	Early-to-Mid Adolescent	Late Adolescent	Adult	
Males weigh more	**ASIA** *Japan*: Miwa in JA Robertson 1923:501* **EUROPE** *Italy*: Pagliani in Robertson 1923:501* **NORTH AMERICA** *United States*: Holt in TB Robertson 1923:500*; Porter in TB Robertson 1923:500*; Holt & McIntosh 1953; Perry et al.2001:2992* **OCEANIA** *Australia*: Magarey et al. 1999:140 (age 15)	**ASIA** *Japan*: Miwa in JA Robertson 1923:501*; Kouda et al. 2003:1107* *Philippines*: Bobbit in TB Robertson 1923:501* **EUROPE** *Italy*: Pagliani in Robertson 1923:501* **LATIN AMERICA** *Dominican Republic*: MV Flinn et al. 1999:469* **MIDDLE EAST** *Turkey*: Tan et al. 2003:1352 **NORTH AMERICA** *Canada*: AM Thompson et al. 2003:1686*; *United States*: GM West 1893*; JA Gilbert 1893:91; JA Gilbert 1897*	**ASIA** *China*: Lei et al. 2004:73 (elderly); *Japan*: Miwa in JA Robertson 1923:501* **EUROPE** *Austria*: Kofler & Poustka 2004:2125; *Britain*: AH Baker & Wardle 2003:271; *Denmark*: AN Pedersen et al. 2002 (elderly, 80 year olds); *Finland*: Geelen et al. 2002:1403; *France*: Ochala et al. 2004:442 (elderly); *Germany*: G Shan & Bohn 2003* (young); *Italy*: Perissinotto et al. 2002; *Netherlands*: Stolk et al. 1996:314 (elderly); Rietveld et al. 2004:196; *Several European Countries*: de Groot et al. 1991 **NORTH AMERICA** *Canada*: Ledoux et al. 1997; Marliss et al. 2000:458 (young); *United States*: RL Jackson & Kelly 1945; Gavan & Swindler 1966; Katch & Weltman 1975; P Freedson et al. 1979 Comuzzie et al. 1993:730 (Mexican Americans); Kwo et al. 1998:1554 (young); al'Absi et al. 1999:334; Pritzlaff et al. 1999; AS Jackson et al. 2002:791; Treiber et al. 2002:709; Karasik et al. 2003:311; Koertge et al. 2003:1320 (CAD patients); G Shan & Bohn 2003* (young); Marczinski et al. 2005:388; Nicolay & Walker 2005:607 **OCEANIA** *Australia*: A Wright et al. 2002:286 (young); *New Guinea*: Ulijaszek 1993	**EUROPE** *Britain*: RR Baker & Bellis 1993:872 *Scotland*: Der et al. 1999:274; *Sweden*: Kuskowska-Wolk et al. 1991 **NORTH AMERICA** *United States*: Loeppky et al. 2000 **HOMINID** *Australopithecus*: McHenry 1986; McHenry 1991; BG Richmond & Jungers 1995; Lockwood et al. 1996
No signif. difference	**ASIA** *Japan*: Kouda et al. 2003:1107*; Kouda et al. 2004:80 **EUROPE** *Sweden*: Key in TB Robertson 1923:501* **NORTH AMERICA** *Canada*: AM Thompson et al. 2003:1686* *United States*: Roche & Malina 1983:204*			
Females weigh more	**EUROPE** *Britain*: Habbukuk 1926* **NORTH AMERICA** *Canada*: F Boas & Wissler 1897*; *United States*: GM West 1893*; JA Gilbert 1897*; FW Smedley 1902:115; F Boas & Wissler 1897*; McNemar & Terman 1936:24*			

1.2.1.5. Weight, Individual Variability in

One study was located pertaining to sex differences in variability in weight and reported that males exhibited greater intra-sex variability than do females (Table 1.2.1.5).

Table 1.2.1.5. Weight, individual variability in.

Nature of Any Difference	Postpubertal
	Adult
Males more	**NORTH AMERICA** *Canada* Marliss et al. 2000:458 (young) **INTERNATIONAL** *Multiple Countries*: Archer & Mehdikhani 2003 (meta-analysis) **INSECT** *Seaweed Fly*: Wilcockson et al. 1995
No signif. Difference	
Females more	

1.2.1.6. Weight/Body Size Among Non-Primates

An enormous number of studies have assessed the weight and/or body size (or body mass) differences between males and females among non-human species, nearly all of which were limited to full-grown adults. Because of the volume of studies, the findings are summarized in a series of split tables (Split-Tables 1.2.1.6a through 1.2.1.6e).

1.2.1.6a. Weight/Body Size Among Invertebrates and Amphibians

The first of these tables (Split-Table 1.2.1.6a) pertains to invertebrates and amphibians. The one study of an insect species found males to be larger. In the case of amphibians, all of the evidence on salamanders found females to be larger than males.

Table 1.2.1.6a. Weight/body size among invertebrates and amphibians.

Nature of Any Difference					Postpubertal
					Adult
Males heavier/larger					**INSECT** *Seaweed Fly*: Wilcockson et al. 1995
No signif. difference					
Females heavier/ larger					**AMPHIBIAN** *Salamander*: Valdivieso & Tamsitt 1965 (Adspersa salamander); Vial 1968 (Subpalmata salamander); Hauck 1977a (2 of 2 species); Houck 1977b (10 of 10 species); McCranie & Wilson 1993 (4 of 4 salamander species); McCranie et al. 1996 (Dofleini salamander); Wake 1996 (Gabrieli salamander); RC Bruce 1997 (Colonnea salamander); RC Bruce 1999 (Picadai salamander)

1.2.1.6b. Weight/Body Size Among Birds

Split-Table1.2.1.6b pertains to birds. Among these groups of animals, the findings have been quite mixed. In about half of all species, adult females were found to be larger, while males were larger in about one-fourth of the species, and no significant sex difference was documented in the remaining one-fourth.

Split-Table 1.2.1.6b. Weight/body size among birds.

Nature of Any Difference					Postpubertal
					Adult
Males heavier/ larger					**BIRD** *Atlantic Puffin*: Cramp 1985; *Black-Bellied Sandgrouse*: Cramp 1985; *Black-Winged Stilt*: Cramp & Simmons 1983; Marchant & Higgins 1993; Szekely & Reynolds 1995; *Buff-Breasted Sandpiper*: Pitelka et al. 1974; Cramp & Simmons 1983; Jehl & Murray 1986; *Bush Stone-Curlew*: Marchant & Higgins 1993; Szekely & Reynolds 1995; *Common Guillemont*: Cramp 1985; *Great Bustard*: Raihani et al. 2006; *Great Reed Warbler*: Westerdahl et al. 2000; *Herring Gull*: Cramp & Simmons 1983; *Pectoral Sandpiper*: Pitelka et al. 1974; Cramp & Simmons 1983; Jehl & Murray 1986; Szekely & Reynolds 1995; *Sharp-tailed Sandpiper*: Pitelka et al. 1974; Johnsgard 1981; Cramp & Simmons 1983; Colston & Burton 1988; Szekely & Reynolds 1995; *Red-Winged Blackbird*: Weatherhead & Teather 1991; *Ruff*: Carmp & Simmons 1983; Szekely& Reynolds 1995; *Snowy Sheatbill*: Marchant & Higgins 1993; Szekely & Reynolds 1995; *Spur-Winged Plover*: Walters 1982; Cramp & Simmons 1983; Szekely & Reynolds 1995; *Yellow-Headed Blackbird*: CB Patterson et al. 1980
No signif. difference					**BIRD** *Australian Pratincole*: Higgins & Davies 1996; *Baird's Sandpiper*: Pitelka et al. 1974; Cramp & Reynolds 1983; Jehl & Murray 1986; Szekely & Reynolds 1995; *Common Tern*: Cramp 1985; *Curlew Sandpiper*: Pitelka et al. 1974; Cramp & Simmons 1983; Jehl & Murray 1986; Szekely & Reynolds 1995; *Eastern Collared Protincole*: Jehl & Murray 1986; Szekely & Reynolds 1995; Higgins & Davies 1996; *European Golden Plover*: Cramp & Simmons 1983; *Kentish Ploves*: Cramp & Simmons 1983; Szekely & Reynolds 1995; *Little Gull*: Cramp & Simmons 1983; *Little Ringed Ploves*: JP Myers et al. 1982; Cramp & Simmons 1983; *Rufous-necked Stint*: Pitelka et al. 1974; Cramp & Simmons 1983; Jehl & Murray 1986; Colton & Burton 1988; Szekely & Reynolds 1995; *Spotted Sandpiper*: Oring & Lank 1986; Szekely & Reynolds 1995
Females heavier/ larger					**BIRD** *American Jacana*: Jenni & Collier 1972; ER Blake 1977; Szekely & Reynolds 1995; del Hoyo et al. 1996; *American Woodcock*: Jehl & Murray 1986; Poole & Gill 1992; Szekely & Reynolds 1995; *Comb-crested Jacana*: Marchant & Higgins 1993; Szekely & Reynolds 1995; del Hoyo et al. 1996; *Common Redshank*: Cramp & Simmons 1983; Szekely & Reynolds 1995; *Common Sandpiper*: Cramp & Simmons 1983; Szekely & Reynolds 1995; *Common Snipe*: Cramp & Simmons 1983; Szekely & Reynolds 1995; *Coucal*: Andersson 1995; *Bald Eagle*: Bortolotti 1986; *Black Coucal*: Goymann & Wingfield. 2004a; *Black Guillemot*: S Cramp 1985; *Black-tailed Godwit*: Cramp & Simmons 1983; Szekely & Reynolds 1995; *Dunlin*: Cramp & Simmons 1983; Szekely & Reynolds 1995; *Eurasian Woodcock*: Cramp & Simmons 1983; Szekely & Reynolds 1995; *Great Knot*: Cramp & Simmons 1983; *Great Snipe*: Cramp & Simmons 1983; Jehl & Murray 1986; Saether et al. 1986; Szekely & Reynolds 1995; *Least Sandpiper*: Cramp & Simmons 1983; Poole & Gill 1992; Szekely & Reynolds 1995; *Least Seed-snipe*: MacLean 1969; Blake 1977; Jehl & Murray 1986; *Lesser Florican*: Raihani et al. 2006; *Long-toed Stint*: JP Myers et al. 1982; Cramp & Simmons 1983; PS Tomkovich 1989; *Northern Lapwing*: Cramp & Simmons 1983; Szekely & Reynolds 1995; Byrkjedal et al. 1997; *Oyster Catcher*: Cramp & Simmons 1983; Jehl & Murray 1986; Urban et al. 1986; Szekely & Reynolds 1995; *Painted Snipe*: Cramp & Simmons 1983; Marchant & Higgins 1993; Szekely & Reynolds 1995; *Plains Wanderer*: Marchant & Higgins 1993; Szekely & Reynolds 1995; *Purple Sandpiper*: Cramp & Simmons 1983; Jehl & Murray 1986; Colston & Burton 1988; Szekely & Reynolds 1995; *Red Knot*: Cramp & Simmons 1983; Szekely & Reynolds 1995; *Red-necked Phalarope*: Cramp & Simmons 1983; Szekely & Reynolds 1995; *Rock Sandpiper*: Prater et al. 1977; Myers et al. 1982; Dunning 1993; *Ruddy Turnstone*: Cramp & Simmons 1983; Jehl & Murray 1986; Szekely & Reynolds 1995; *Sanderling*: Cramp & Simmons 1983; Szekely & Reynolds; *Semipalmated Sandpiper*: Pitelka et al. 1974; Cramp & Simmons 1983; Jehl & Murray 1986; Colston & Burton 1988; Szekely & Reynolds 1995; *South Polar Skua*: Higgins & Davies 1996; *Spotted Sandpiper*: Cramp & Simmons 1983; Jehl & Murray 1986; Oring & Lank 1986; Szekely & Reynolds 1995; *Stilt Sandpiper*: Jehl 1973; Pitelka et al. 1974; Cramp & Simmons 1983; Szekely & Reynolds 1995; *Sub-Antartic Snipe*: Szekely & Reynolds 1995; Higgins & Davies 1996; *Surfbird*: Pool & Gill 1992; del Hoyo et al. 1996; *Western Curlew*: Cramp & Simmons 1983; Szekely & Reynolds 1995; *Western Sandpiper*: Pitelka et al. 1974; Cramp & Simmons 1983; Jehl & Murray 1986; Colton & Burton 1988; Szekely & Reynolds 1995; Higgins & Davies 1996; *White-rumped Sandpiper*: WRB Oliver 1955; Cramp & Simmons 1983; Poole & Gill 1992; Szekely & Reynolds 1995

1.2.1.6c. Weight/Body Size Among Marsupials.

In the vast majority of adult marsupial species, males exceed the weight or body size of females. Only in a few species were no significant sex differences found (Split-Table 1.2.1.6c).

Split-Table 1.2.1.6c. Weight/body size among marsupials.

Nature of Any Difference	Postpubertal
	Adult
Males heavier/ larger	**MARSUPIAL** *Agile Wallaby*: Strahan 1983; Jarman 1991*; *Antilopine Wallaroo*: Strahan 1983; Jarman 1991*; *Black-striped Wallaby*: Strahan 1983; *Eastern Gray Kangaroo*: Strahan 1983; Jarman 1991*; *Gray Short-Tail Opossum*: Kraus & Fadem 1987; *Lumholtz's Tree Kangaroo*: Strahan 1983; Jarman 1991*; *Nail-Tailed Wallaby*: Strahan 1983; *Parma Wallaby*: Strahan 1983; Jarman 1991*; *Red-Bellied Pademelon*: Strahan 1983; Jarman 1991*; *Red Kangaroo*: Strahan 1983; Jarman 1991*; *Red-Legged Pademelon*: Strahan 1983; Jarman 1991*; *Red-Necked Pademelon* : Strahan 1983; Jarman 1991*; *Red-Necked Wallaby*: Strahan 1983; Jarman 1991*; *Swamp Wallaby*: Strahan 1983; *Tammar Wallaby*: Strahan 1983; Jarman 1991*; *Western Gray Kangaroo*: Strahan 1983; Jarman 1991*; *Whiptail Wallaby*: Strahan 1983; Jarman 1991*
No signif. difference	**MARSUPIAL** *Little Rock Wallaby*: Strahan 1983; Jarman 1991*; *Rock Wallaby*: Strahan 1983; Jarman 1991*; *Western Brush Wallaby*: Strahan 1983; Jarman 1991*
Females heavier/ larger	

1.2.1.6d. Weight/Body Size Among Mammals Other Than Ungulates and Primates

As shown in Split-Table 1.2.1.6d, among most species of mammals other than ungulates and primates, males are larger than females, at least in adulthood.

Split-Table 1.2.1.6d. Weight/body size among mammals other than ungulates and primates.

Nature of Any Difference	Prepubertal	Postpubertal
	Infant	Adult
Males heavier/ larger		**CANINE** *Dog*: JP Scott & Fuller 1965:329 **MUSTELID** *African Clawless Otter*: Kingdon 1971; *African Striped Weasel*: Estes 1991; *American Badger*: Messick & Hornocker 1981; *American Mink*: JL Mitchell 1961; Banfield 1974; *American Pine Marten*: Banfield 1974; *Black-footed Ferret*: Anderson et al. 1986; *Canadian River Otter*: Banfield 1974; Stephensoon 1977; *Ermine*: Ridgeway & Harrison 1981; *European Pine Marten*: Ridgeway & Harrison 1981; *European Polecat*: Ridgeway & Harrison 1981; *European River Otter*: Corbet & Harris 1991; *Fisher*: Wright & Coulter 1967; Banfield 1974; *Giant Otter*: Duplaise 1980; *Hog-nosed Skunk*: van Gelder 1968; *Least Weasal*: Ridgeway & Harrison 1981; *Long-tailed Weasel*: Brown & Lasiewski 1972; Banfield 1974; *Old World Badger*: Ridgeway & Harrison 1981; *Sea Otter*: Ridgeway & Harrison 1981; *Striped Polecat*: Estes 1991; *Striped Skunk*: Verts 1967; *Wolverine*: Rausch & Pearson 1972 **PINNIPED** *Australian Sea Lion*: Ridgeway & Harrison 1981; *Bearded Seal*: Bonner 1990; *California Sea Lion*: Ridgeway & Harrison 1981; FE Fish et al. 2003; *Elephant Seal*: Le Boeuf & Reiter 1988; Slip et al. 1994; Le Boeuf et al. 2000; *Galapagos Fur Seal*: Trillmich 1987; *Gray Seal*: Corbet & Harris 1991; Mohn & Bowen 1996; CA Beck et al. 2003:781 (length & weight); *Harbor Seal*: Corbet & Harris 1991; Coltman et al. 1997; WD Bowen et al. 1999; *New Zealand Sea Lion*: Ridgeway & Harrison 1981; *Northern Elephant Seal*: Bonner 1990; *Northern Fur Seal*: Banfield 1974; *Ringed Seal*: Bonner 1990; *Ross Seal*: Bonner 1990; *Southern Elephant Seal*: Bonner 1990; *Southern Fur Seal*: Ridgeway & Harrison 1981; *Southern Sea Lion*: Renouf 1994; *Spotted Seal*: Bonner 1990; *Steller's Sea Lion*: Ridgeway & Harrison 1981; *Walrus*: Corbet & Harris 1991 **PROBOSID** *African Elephant*: Laws et al. 1975; *Asian Elephant*: Sukumar 1989 **RODENT** *Coypu*: Gasling 1986; *Mouse*: Wiedmer et al. 2004:2861; *Rat*: HD King 1915 (body size); Leshner & Collier 1973; Li & Lumeng 1984; Beaston-Wimmer & Smolen 1991; Jankala et al. 2005 (weight); Piano et al. 2005
No signif. difference	**PINNIPED** *Elephant Seal*: Bell et al. 1997 (first year of life) **RODENT** *Rat*: Beaston-Wimmer & Smolen 1991*(postnatal day 1)	**MUSTELID** *Honey Badger*: RD Estes 1991 **PINNIPED** *Baikal Seal*: Bonner 1990; *Caspian Seal*: Bonner 1990; *Harp Seal*: Bonner 1990; *Ribbon Seal*: Bonner 1990 **RODENT** *Skuas*: Furness 1987; Kalmbach et al. 2001
Females heavier/ larger		**PINNIPED** *Hawaiian Monk Seal*: Bonner 1990; *Leopard Seal*: Bonner 1990; *Mediterranean Monk Seal*: Bonner 1990; *Weddell Seal*: Bryden et al. 1984; Bonner 1990 **RODENT** *Hamster*: K Kowalewski 1969 (weight)

1.2.1.6e. Weight/Body Size Among Ungulates

In the case of ungulates, males have been found to be larger than females on average in nearly all species (Split-Table 1.2.1.6e).

Split-Table 1.2.1.6e. Weight/body size among ungulates.

Nature of Any Difference		Postpubertal
		Adult
Males heavier/ larger		**UNGULATE** *African Buffalo*: Georgiadis 1985; Estes 1991; *American Bison*: Berger & Peacock 1988; *Axis Deer*: Strahan 1983; *Barbary Sheep*: Simpson 1980; *Big Horn Sheep*: DA Blood et al. 1970; Ruckstuhl 1998; *Bison*: Van Vuren 1983; Krosinska et al. 1987; *Black Wildebeest*: Georgiadis 1985; Estes 1991; *Blacktail Deer*: Bowyer et al. 1996; *Bluebuck*: WJ Sheffield 1983; *Blue Sheep*: MK Oli 1994; *Bongo*: Estes 1991; *Brow-antlered Deer*: Geist & Bayer 1988; Putman 1988; *Bush Buck*: Georgiadis 1985; Estes 1991; *Caribou*: TK Fuller & Keith 1981; *Chamois*: J Kingdon 1971; Lovari & Cosentino 1986; *Chinese Water Deer*: Corbet & Harris 1991; *Common Eland*: Georgiadis 1985; Estes 1991; *Dall's Sheep*: Bunnel & Olsen 1976; *Deer*: Eloranta & Nieminen 1986; Kojola 1989:183; *Domestic Sheep*: Corbet & Harris 1991; *Elk*: Bender & Haufler 1996; *Fallow Deer*: Corbet & Harris 1991; *Gaur*: Owen-Smith 1988; *Gemsbock*: Estes 1991; *Gerenuk*: Kingdon 1971; Estes 1991; *Giraffe*: Estes 1991; Ginnett & Demment 1997; *Grant's Gazelle*: Georgiadis 1985; Estes 1991; *Greater Kudu*: Georgiadis 1985; Estes 1991; *Hartebeest*: Kingdon 1971; Estes 1991; *Hog Deer*: Putman 1988; Dhungel & O'Gara 1991; *Impala*: J Kingdon 1971; RD Estes 1991; *Kob*: Georgiadis 1985; Estes 1991; *Lechwe*: Georgiadis 1985; Estes 1991; *Lesser Kudu*: Georgiadis 1985; Estes 1991; *Moose*: Miquelle 1991; Miquelle et al. 1992; Molvar & Bowyer 1994; *Mouflon*: Bon et al. 1992; *Mountain Goat*: Banfield 1974; *Mountain Sheep*: Bleich et al. 1997; *Mule Deer*: Anderson et al. 1974; *Musk Deer*: Putman 1988; *Musk Ox*: DR Gray 1973; PB Latour 1987; Heard 1992; *Nyala*: Georgiadis 1985; Estes 1991; *Pere David's Deer*: Beck & Wemmer 1983; *Pronghorn*: GJ Mitchell 1971; Byers et al. 1994; *Pronghorn Sheep*: Kitchen 1974; *Puku*: Kingdon 1971; Estes 1991; *Red Deer*: Flook 1970; Clutton-Brock et al. 1982; *Reed Buck*: Kingdon 1971; Estes 1991; *Reindeer*: Clutton-Brock et al. 1982; Leader-Williams 1988; *Road Antelope*: Georgiadis 1985; Estes 1991; *Roe Deer*: Corbet & Harris 1991; NG Chapman et al. 1993; Danilkin 1996; *Sable Antelope*: Georgiandis 1985; Estes 1991; *Saiga*: Bannikov 1961; *Sambar Deer*: Strahan 1983; *Sika Deer*: Corbet & Harris 1991; *Sitatunga*: Estes 1991; *Soay Sheep*: Perez-Barberia & Gordon 1999:260; *Springbok*: Georgiadis 1985; RD Estes 1991; *Sunda Samba*: Strahan 1983; *Tahr*: CM King 1990; *Thomson's Gazelle*: N Georgiadis 1985; RD Estes 1991; *Topi*: Georgiadis 1985; Estes 1991; *Water Buck*: Kingdon 1971; Estes 1991; *Whitetail Deer*: Hirth 1977; McCullough 1979; Lagory 1986; Leberg et al. 1992; *Wild Goat*: GB Schaller 1979; O'Brien 1984; *Wild Sheep*: Grubb 1974
No signif. difference		**UNGULATE** *Beira Antelope*: RD Estes 1991; RM Nowak 1991; *Brochet Deer*: Geist & Bayer 1988; Putman 1988; *Duike Antelope*: J Kingdon 1971; RD Eskes 1991; *Gray Duiker*: Georgiadis 1985; RD Estes 1991; *Klipspringer Antelope*: RIM Dunbar 1990;RD Estes 1991; *Rhebok Antelope*: Owen-Smith 1988; *Serow*: H.Soma 1987; *Steenbok Antelope*: J Kingdon 1971; RD Estes 1991
Females heavier/ larger		**UNGULATE** *Barking Deer*: Corbet & Harris 1991; *Bates Dwarf Antelope*: Kingdon 1971; RD Estes 1991; *Dik Dik*: Kingdon 1971; RD Estes 1991; *Oribi*: Kingdon 1971; RD Estes 1991

1.2.1.7. Weight/Body Size Among Primates Except Humans

Given the very large number of studies of sex differences in the adult body size of primates, the ensuing table is split into the following groupings: apes, prosimians, African primates other than apes, Asiatic primates other than apes, New World primates. With respect to sex differences in body size among most species of primates, males are larger. This generalization was also reached by a study of 53 species of primates by Leutenegger (1982). He reported that in 45 species males were larger, in 3 species females were larger, and in five species there was no significant difference.

1.2.1.7a. Weight/Body Size among Apes

Apes are indigenous to Africa and southern Asia. Split-Table 1.2.1.7a shows that in all but a few species of the so-called lesser apes the findings have been very consistent in indicating that males are larger on average than females.

Split-Table 1.2.1.7a. Weight/body size among apes.

Nature of Any Difference		Postpubertal
		Adult
Males heavier/ larger		**APE** *Agile Gibbon*: van den Berghe 1973; Gaulin & Sailer 1984; Payne & Francis 1985; *Chimpanzee*: Gavan & Swindler 1966; Fedigan 1982:55; Estes 1991; Watts & Pusey 1993; *Gorilla*: Gavan & Swindler 1966; Napier & Napier 1967*; Gijzen & Tijskens 1971; Scollay et al. 1975; Harvey & Clutton-Brock 1985; Jungers 1985; Fleagle 1988; Estes 1991; *Orangutan*: Napier & Napier 1967*; DeSilva 1971; Mackinnon 1974; HD Rijksen 1975; Harvey & Clutton-Brock 1985; Jungers 1985; Watts & Pusey 1993; *Siamang*: Leufenegger & Cheverud 1982; Gaulin & Sailer 1984; *Silvery Javan Gibbon*: Harvey & Clutton-Brock 1985; *White-Browed Gibbon*: Leufenegger & Cheverud 1982; Harvey & Clutton-Brock 1985; *White-Handed Gibbon*: Napier & Napier 1967*; Roonwal & Mohnot 1977; Gaulin & Sailer 1984
No signif. difference		**APE** *Siamang Ape*: Fedigan 1982:54*
Females heavier/ larger		**APE** *Black Gibbon*: Harvey & Clutton-Brock 1985; *Kolss' Gibbon*: Harvey & Clutton-Brock 1985

1.2.1.7b. Weight/Body Size among Prosimians

Prosimians are the descendants of most primitive appearing primates. According to Split-Table 1.2.1.7b, prosimians tend to be almost evenly divided between species in which there are no significant gender differences in body size and those in which males are larger.

Split-Table 1.2.1.7b. Weight/body size among prosimians.

Nature of Any Difference					Postpubertal
					Adult
Males heavier/ larger					**PROSIMIAN IN MADAGASCAR & AFRICA** *Bushbaby*: Chiarelli 1972; *Coquerel's Mouse Lemur*: Kappeler 1997; *Fork-marked Lemur*: Harvey & Clutton-Brock 1985; *Garnett's Greater Bush Baby*: Bearder 1987; *Gentle Lemur*: Jorde & Spuhler 1974; *Golden Potto*: Gaulin & Sailer 1984; *Hairy-eared Lemur*: Kappeler 1991; *Lesser Bush Baby*: GA Doyle 1974; *Northern Lesser Bush Baby*: Harvey & Clutton-Brock 1985; Bearder 1987; Kappeler 1990; *Potto*: Gaulin & Sailer 1984; *Purple-Faced Langur*: Napier & Napier 1967*; Napier 1985; *Pygmy Loris*: Kappeler 1991; *Ring-Tailed Lemur*: Gaulin & Sailer 1984; *Ruffed Lemur*: Harvey & Clutton-Brock 1985; Kappeler 1990; *Slender Loris*: Napier & Napier 1967*; Gaulin & Sailer 1984; *Slow Loris*: Napier & Napier 1967*; Harvey & Clutton-Brock 1985; Kappeler 1990; Kappeler 1991; *Thick-tailed Lesser Bush Baby*: Harvey & Clutton-Brock 1985; Kappeler 1990; Kappeler 1991; *Verreaux's Sifaka*: GA Doyle 1979; Gaulin & Sailer 1984; Kappeler 1991; PC Wright 1999
No signif. difference					**PROSIMIAN IN MADAGASCAR & AFRICA** *Black Lemur*: Harvey & Clutton-Brock 1985; Kappeler 1990; Kappeler 1991; Wright 1999; *Brown Lemur*: Gaulin & Sailer 1984; *Cocquerel's Mouse Lemur*: Harvey & Clutton-Brock 1985; Kappeler 1990; *Diademed Sifaka*: Harvey & Clutton-Brock 1985; Kappeler 1990; *Fat-tailed Dwarf Lemur*: Harvey & Clutton-Brock 1985; Kappeler 1990; Fietz 1999a; *Gray Mouse Lemur*: Harvey & Clutton-Brock 1985; Kappeler 1990; *Greater Dwarf Lemur*: Harvey & Clutton-Brock 1985; Kappeler 1990; *Indri*: Gaulin & Sailer 1984; *Lesser Bamboo Lemur*: Harvey & Clutton-Brock 1985; Kappeler 1990; Kappeler 1991; *Mongoose Lemur*: Gaulin & Sailer 1984; Kappeler 1991; *Mouse Lemur*: Fietz 1998; Fietz 1999b; *Red-tailed Sportive Lemur*: Harvey & Clutton-Brock 1985; Kappeler 1990; *Ringtail Lemur*: Jorde & Spuhler 1974; *Sifaka*: Jorde & Spuhler 1974; *Southern Needle-clawed Bush Baby*: Harvey & Clutton-Brock 1985; Kappeler 1990; Kappeler 1991; *Verreaux's Sifaka*: Kraus et al. 1999; Lawler et al. 2005; *Weasel Sportive Lemur*: Gaulin & Sailer 1984; *Wolly Lemur*: Harvey & Clutton-Brock 1985; Kappeler 1990; Mittermeier et al. 1994; Wright 1999
Females heavier/ larger					**PROSIMIAN IN MADAGASCAR** *White-footed Sportive Lemur*: Kappelar 1991

1.2.1.7c. Weight/Body Size Among African Primates Other Than Apes

Nearly all studies of sex differences in the body size of African primates have concluded that males are larger than females (Split-Table 1.2.1.7c).

Split-Table 1.2.1.7c. Weight/body size among African primates other than apes.

Nature of Any Difference					Postpubertal
					Adult
Males heavier/ larger					**AFRICAN PRIMATE (EXCEPT APE)** *Agile Mangabey*: Groves 1989; *Allen's Swamp Monkey*: Gautier-Hion 1988a; *Black Colobus*: Harvey & Clutton-Brock 1985; Estes 1991; *Black & White Colobus*: JF Oates 1977; *Blue Monkey*: Coelho 1974; Napier 1981; Gaulin & Sailer 1984; Estes 1991; *Campbell's Guenon*: Napier 1981; Oates et al. 1990; *Chacma Baboon*: Harvey et al. 1987; Estes 1991; *Common Baboon*: Jorde & Spuhler 1974; *Drill*: Harvey & Clutton-Brock 1985; Harvey et al. 1987; Estes 1991; *Eastern Black-and-white Colobus*: Oates et al. 1994; Harvey & Clutton-Brock 1985; Estes 1991; *De Brazza's Monkey*: Napier 1981; Gaulin & Sailer 1984; Estes 1991; *Diana Monkey*: Oates et al. 1990; *Gelada Baboon*: Fedigan 1982:55; Fleagle 1988; Estes 1991; *Gray-Cheeked Mangabey*: Napier 1981; Gaulin & Sailer 1984; Estes 1991; *Greater Spot-Nosed Guenon*: Harvey & Clutton-Brock 1985; Estes 1991; *Guinea Baboon*: Harvey & Clutton-Brock 1985; *Hamadryas Baboon*: Harvey & Clutton-Brock 1985; Estes 1991; Kummer 1995; *Lesser Spot-Nosed Guenon*: Napier 1981; Oates et al. 1990; *L'Hoest's Monkey*: Harvey & Clutton-Brock 1985; H Gervaerts 1992; M Colyn 1994; *Mandrill Baboon*: Schultz 1956; Napier & Napier 1967*; Jouventin 1975; Harvey & Clutton-Brock 1985; Fleagle 1988; Estes 1991; *Mona Monkey*: Harvey & Clutton-Brock 1985; Glenn & Bensen 1998; *Mustached Guenon*: Gaulin & Sailer 1984; Fleagle 1988; Estes 1991; *Olive Baboon*: Napier 1981; Estes 1991; *Olive Colobus*: Oates et al. 1994; *Owl-Faced Monkey*: Gevaerts 1992; Colyn 1994; *Patas Monkey*: Fedigan 1982:54; Harvey & Clutton-Brock 1985; *Pennant's Red Colobus*: Oates et al. 1994; *Red Colobus*: Struhsaker 1969; *Red-Tailed Guenon*: Napier & Napier 1967*; Napier 1981; *Sclater's Guenon*: Oates et al. 1992; *Sooty Mangabey Monkey*: Jorde & Spuhler 1974; Oates et al. 1990; *Sun-Tailed Guenon*: Gautier-Hion 1988b; *Talapoin Monkey*: Gautier-Hion 1975; Gaulin & Sailer 1984; Estes 1991; *Tana River Mangabey*: Napier 1981; Gaulin & Sailer 1984; Estes 1991; *Western Red Colobus*: Harvey & Clutton-Brock 1985; Estes 1991; Oates et al. 1994; *White-Collared Mangabey*: Harvey & Clutton-Brock 1985; Estes 1991; *White-Thighed Black-and-White Colobus*: Oates et al. 1994; *Wolf's Guenon*: Gevaerts 1992; Colyn 1994; *Yellow Baboon*: Napier 1981; Harvey & Clutton-Brock 1985
No signif. difference					**AFRICAN PRIMATE (EXCEPT APE)** *Allen's Bush Baby*: Gaulin & Sailer 1984; Kappeler 1990; *Aye Aye*: Harvey & Clutton-Brock 1985; Kappeler 1990; Kappeler 1991; *Demidoff's Bush Baby*: Gaulin & Sailer 1984; Kappeler 1990; Kappeler 1991; *Talapoin Monkey*: A Segre 1970; *Temminick's Red Colobus*; ED Sarin 1994
Females heavier/ larger					

1.2.1.7d. Weight/Body Size Among Asiatic Primates Other Than Apes

Primates that are indigenous to Asia, including numerous islands that extend into the Indian Ocean, have been investigated extensively regarding sex differences in body size. Nearly all of these studies have concluded that the body size of males surpasses that of females (Split-Table 1.2.1.7d).

Split-Table 1.2.1.7d. Weight/body size among Asiatic primates other than apes.

Nature of Any Difference					Postpubertal	
						Adult
Males heavier/ larger						**ASIATIC/INDIAN OCEAN PRIMATE** *Assamese Macaque*: Smith & Jungers 1997; *Barbary Macaque*: M Fa 1989; Smith & Jungers 1997; *Bonnet Macaque*: Napier & Napier 1967*; M Fa 1989; Smith & Jungers 1997; *Capped Leaf Monkey*: Gaulin & Sailer 1984; Oates et al. 1994; *Celebes Macaque*: Napier & Napier 1967*; *Crab-Eating Macaque*: Napier & Napier 1967*; *Crested Black Macaque*: Smith & Jungers 1997; *Formosan Macaque*: Leufenegger & Cheverud 1982; Smith & Jungers 1997; *Golden Langur*: Harvey & Clutton-Brock 1985; Oates et al. 1994; *Hanuman Langur*: Napier & Napier 1967*; Gaulin & Sailer 1984; Oates et al. 1994; *Hose's Leaf Monkey*: Fleagle 1988; JF Oates et al. 1994; *Japanese Macaque*: Masui et al. 1973; Fedigan 1982:55; Gaulin & Sailer 1984; M Fa 1989; Schaik et al. 1992; *Lion-Tailed Macaque*: Silk & Boyd 1983; Harvey & Clutton-Brock 1985; Fa 1989; *Long-Tailed Macaque*: Bernstein 1970; Silk & Boyd 1983; Gaulin & Sailer 1984; Wrangham et al. 1993; *Maroon Leaf Monkey*: Harvey & Clutton-Brock 1985; van Schaik et al. 1992; Oates et al. 1994; *Mitered Leaf Monkey*: Gaulin & Sailer 1984; Harvey & Clutton-Brock 1985; Oates et al. 1994; *Moor Macaque*: Silk & Boyd 1983; Harvey & Clutton-Brock 1985; *Nilgiri Langur*: Fedigan 1982:55; Gaulin & Sailer 1984; Harvey & Clutton-Brock 1985; Napier 1985; *Phayre's Leaf Monkey*; Napier 1985; *Philippine Tarsier*: Harvey & Clutton-Brock 1985; Kappeler 1990; *Pigtail Langur*: JG Fleagle 1988; JF Oates et al. 1994; *Pigtail Macaque*: Napier & Napier 1967*; Bernstein 1970; Silk & Boyd 1983; Harvey & Clutton-Brock 1985; Fa 1989; *Red-shanked Douc Langur*: Fleagle 1988; *Proboscis Monkey*: Aldrickh-Blake 1979; JA Kern 1964; Napier & Napier 1967*; SJC Gaulin & Sailer 1984; JF Oakes et al. 1994; *Rhesus Macaque*: Napier & Napier 1967*; JH Kirk 1972; Bernstein 1970; Silk & Boyd 1983; Rawlins et al. 1984; Harvey & Clutton-Brock 1985; M Fa 1989; SMS Schwartz & Kemnitz 1992; *Silvered Langur*: Oates et al. 1994; *Spectacled Leaf Monkey*: Harvey & Clutton-Brock 1985; Napier 1985; van Schaik et al. 1992; *Stump-Tailed Macaque*: Chevalier-Skolnikoff 1975; M Fa 1989; Smith & Jungers 1997; *Tibetan Macaque*: Smith & Jungers 1997; *Tonkean Macaque*: Fooden 1969; Smith & Junger 1997; *Sichuan Golden Snub-nosed Monkey*: NG Jabolonski & Ruliang 1995; *Tonkin Snub-nosed Monkey*: R Boonratana & Canh 1994; *Toque Macaque*: W Dittus 1975; Silk & Boyd 1983; Gaulin & Sailer 1984; M Fa 1985; *Vervet Monkey*: Napier 1981; Fedigan 1982:54; Gaulin & Sailer 1984; Estes 1991; *Western Tarsier*: Gaulin & Sailer 1984
No signif. difference						**ASIATIC/INDIAN OCEAN PRIMATE** *Mentawai Island Leaf Monkey*: Tilson 1980; Gaulin & Sailer 1984; Oates et al. 1994; *Spectral Tarsier*: Harvey & Clutton-Brock 1985
Females heavier/ larger						**ASIATIC/INDIAN OCEAN PRIMATE** *Dian's Tarsier*: Tremble et al. 1993; *Grizzled Leaf Monkey*: Fleagle 1988

1.2.1.7e. Weight/Body Size Among New World Primates

Among the species of primates that are native to Central and South America, males are usually larger than females as adults. Nevertheless, Split-Table 1.2.1.7e shows that there appear to be several exceptions, including some in which the adult weight of females exceeds that of males.

Split-Table 1.2.1.7e. Weight/body size among New World primates.

Nature of Any Difference					Postpubertal	
						Adult
Males heavier/ larger						**NEW WORLD PRIMATE** *Bald Uacari*: Ford & Davis 1992; Ford 1994; Plavcan & van Schaik 1997; Smith & Jungers 1997; *Bare-Ear Marmoset*: Ford 1994; *Bearded Saki*: Ford & Davis 1992; Ford 1994; *Black-Faced Saki*: Hershkovitz 1987; Ford 1994; *Black & Gold Howler Monkey*: Ford & Davis 1992; Ford 1994; Leigh 1994; Plavcan & van Schaik 1997; Smith & Jungers 1997; *Black-Handed Spider Monkey*: Ford & Davis 1992; Ford 1994; Leigh 1994; Plavcan & van Schaik 1997; *Black Howler Monkey*: SM Ford 1994; *Black Mangabey*: Napier 1981; *Black Squirrel Monkey*: Ford 1994; *Black Tufted-Eared Marmoset*: Ford 1994; *Bolivian Squirrel Monkey*: Ford 1994; *Brown Capuchin*: Ford & Davis 1992; Ford 1994; Leigh 1994; Plavcan & van Schaik 1997; Smith & Jungers 1997; *Brown Howler Monkey*: Ford & Davis 1992; Plavcan & van Schaik 1997; Smith & Jungers 1997; *Brown Titi Monkey*: Herskovitz 1990; Ford 1994; *Capuchin Monkey*: Napier & Napier 1967*; Coelho 1974; *Common Marmoset*: Ford 1994; *Common Squirrel Monkey*: Ford 1994; *Dusky Titi Monkey*: Ford & Davis 1992; Ford 1994; Leigh 1994; Plavcan & van Schaik 1997; *Geoffroy's Marmoset*: Ford 1994; *Golden Backed Squirrel Monkey*: Ford 1994; *Golden-Handed Tamarin*: Ford 1994; *Golden Headed Lion Tamarin*: Ford 1994; *Howler Monkey*: BL Pope 1966; Napier & Napier 1967*; *Mantled Howler Monkey*: Ford & Davis 1992; Ford 1994; Plavcan & van Schaik 1997; Smith & Jungers 1997; *Monk Saki*: Ford & Davis 1992; Ford 1994; Smith & Jungers 1997; *Mustached Tamarin*: Ford 1994; *Pygmy Marmoset*: Ford 1994; *Red-Backed Squirrel Monkey*: Ford 1994; *Red-Handed Howler Monkey*: Ford & Davis 1992; Ford 1994; Plavcan & van Schaik 1997; Smith & Jungers 1997; *Red Howler Monkey*: Ford & Davis 1992; Ford 1994; Plavcan & van Schaik 1997; *Snethlages Marmoset*: SM Ford 1994; *Spider Monkey*: Eisenberg & Kuehn 1966; Napier & Napier 1967*; *Squirrel Monkey*: Jorde & Sphuler 1974; *Weeper Capuchin*: Ford & Davis 1992; Ford 1994; Plavcan & van Schaik 1997; Smith & Jungers 1997; *White-bellied Spider Monkey*: SM Ford 1994; *White-Faced Saki*: Ford & Davis 1992; Ford 1994; Leigh 1994; Plavcan & van Schaik 1997; Smith & Jungers 1997; *White-Fronted Capuchin*: Ford & Davis 1992; Ford 1994; Leigh 1994; *White-Nosed Bearded Saki*: Ford & Davis 1992; Ford 1994; *White-Throated Capuchin*: Ford & Davis 1992; Ford 1994; Smith & Jungers 1997; *Woolly Monkey*: Ford & Davis 1992; Ford 1994; Leigh 1994; Plavcan & van Schaik 1997; Mith & Jungers 1997; *Wooly Spider Monkey*: Ford 1994
No signif. difference						**NEW WORLD PRIMATE** *Bare-faced Tamarin*: SM Ford 1994; *Brown-headed Spider Monkey*: SM Ford 1994; *Collared Titi Monkey*: Kinzey 1981; SM Ford 1994; *Common Marmoset*: Power et al. 2001; *Dusky Titi*: Fedigan 1982:54*; *Maues Marmoset*: Mittermeier et al. 1992; *Red-crested Tamarin*: SM Ford 1994; *Southern Red-necked Monkey*: PC Wright 1984; *Yellow-Handed Titi*: Fedigan 1982:54*
Females heavier/ larger						**NEW WORLD PRIMATE** *Black Spider Monkey*: SM Ford & Davis 1992; SM Ford 1994; *Cottontail Tamarin*: Napier & Napier 1967; *Cotton-top Tamarin*: SM Ford 1994; *Masked Titi Monkey*: Hershkovitz 1990; SM Ford 1994; *Northern Gray-necked Owl Monkey*: SM Ford 1994; *Owl Monkey*: Napier & Napier 1967*; *Red-handed Tamarin*: Napier & Napier 1967*; *Red-bellied Tamarin*: SM Ford 1994; *Red Titi Monkey*: Hershkovitz 1990; SM Ford & Davis 1992; SM Ford 1994; RJ Smith & Jungers 1997; *Saddleback Tamarin*: Napier 1976; SM Ford 1994; *Tassel-eared Marmoset*: SM Ford 1994

1.2.2. Bodily Proportions

Bodily proportions have to do with ratios of one aspect of the body relative to some other aspect, such as weight relative to height.

1.2.2.1. Body Mass Index (Weight-to-Height Ratio)

Extensive research, as shown in Table 1.2.2.1, has been published regarding gender differences in body mass index (the weight-to-height ratio), the majority of which have involved adult subjects. These studies lead one to an inconsistent conclusion with respect to any differences. Ultimately, the answer may depend upon the population or sub-population being studied.

Table 1.2.2.1. Body mass index (weight-to-height ratio).

Nature of Any Difference	Prepubertal				Postpubertal		Multiple Age Categories
	Infant	Toddler		Childhood	Adolescent	Adult	
Males higher	**ASIA** *China* Tam et al. 1999: 509*				**ASIA** *China*: Li et al. 2005:1140* (early adolescence); *Japan*: Kouda et al. 2004:80 (young);**EUROPE** *Italy*: DeVito et al. 1999:651* **NORTH AMERICA** *Canada*: Galambos et al. 2004:20	**EUROPE** *Denmark*: Roepstorff et al. 2002:E43b (young); *Finland*: Lahti-Koski et al. 2001* (young); Geelen et al. 2002:1403; *France*: Faurie et al. 2004:3 (college); *Italy*: DeVito et al. 1999:651*; *Netherlands*: Seidell et al. 1995* (young) *Poland*: Bielicki et al. 2001:167* (ages 22-40) **NORTH AMERICA** *Canada*: Marliss et al. 2000:458 (young); *United States*: Flegal et al. 1998* (young); al'Absi et al. 1999:334; DiGioacchino et al. 2001* (college, Whites); Karasik et al. 2003:311; Stini 2003:40*	**EUROPE** *Belgium*: Moens et al. 1999 (full-time workers); *Sweden*: Kuskowska-Wolk et al. 1991
No signif. difference		**ASIA** *China* Tam et al. 1999:509*		**ASIA** *China*: Li et al. 2005:1140* **OCEANIA** *New Zealand*: S Williams 2001	**NORTH AMERICA** *United States*: Ambrosius et al. 1998:244	**ASIA** *China*: Lei et al. 2004:73 (elderly); *Taiwan*: Hsu et al. 2002:58 **EUROPE** *Britain*: AH Baker & Wardle 2003:271; O Evans & Steptoe 2003:765 (medical school); *Finland*: Lahti-Koski et al. 2001*; *Italy*: Zamboni et al. 2003:323 (elderly); *Netherlands*: Seidell et al. 1995*; Stolk et al. 1996:314 (elderly); *Poland*: Bielicki et al. 2001:167* (ages 41-50); *Sweden*: Hellstrom et al. 2000:459 **NORTH AMERICA** *United States*: BV Howard et al. 1995:393; Flegal et al. 1998*; DiGioacchino et al. 2001* (college, Blacks); AS Jackson et al. 2002:791; Treiber et al. 2002:709; Cnop et al. 2003:461; Stini 2003:40* (elderly); Stranges et al. 2004:951 (middle age/elderly)	**EUROPE** *Belgium*: Kornitzer & Bara 1989 **NORTH AMERICA** *Canada*: Pascot et al. 2002:401
Females higher				**EUROPE** *Austria*: Kirchengast & Steiner 2001 **OCEANIA** *New Zealand*: EC Rush et al. 2003:4		**EUROPE** *Denmark*: Roepstorff et al. 2002:E43b; *Finland*: Lahti-Koski et al. 2001* (elderly); *Italy*: Perissinotto et al. 2002 (elderly); *Netherlands*: Seidell et al. 1995* (elderly); *Poland*: Bielicki et al. 2001:167* (ages 51-60) **NORTH AMERICA** *United States*: Comuzzie et al. 1993:730 (Mexican Americans); Flegal et al. 1998* (elderly) **OCEANIA** *Australia*: Wang & Hoy 2004:510 (aborigines, diabetes sufferers)	**EUROPE** *Britain*: Womersley & Durnin 1977; *Spain* Gutierrez-Fisac et al. 1995 **NORTH AMERICA** *United States*: AS Jackson et al. 1980; Deurenberg et al. 1991; Deurenberg et al. 1998; AS Jackson et al. 2002:791

1.2.2.2. Overweight

Most studies of obesity use the body mass index (BMI), which involves converting height and weight to metrics and then dividing one's weight by the square of one's height. The most widely used BMI range for designating a person as overweight is 25 to 29, with values in excess of 30 considered obese (Flegal 1999:S509).

According to Table 1.2.2.2, research on gender differences in the proportions of persons who are overweight has provided mixed findings, although most studies indicate that a greater proportion of females than males are overweight, especially after adolescence.

Table 1.2.2.2. Overweight.

Nature of Any Difference	Prepubertal			Postpubertal		Multiple Age Categories
	Toddler	Early Childhood	Childhood	Adolescent	Adult	
More in males			**LATIN AMERICA** *Chile*: Olivares et al. 2004:1281 **NORTH AMERICA** *United States*: Troiano et al. 1995; TJ Cole et al. 2000	**ASIA** *Japan*: Kouda et al. 2004:80 (young, BMI > 25)	**EUROPE** *Belgium*: Moens et al. 1999 **NORTH AMERICA** *Canada*: Millar & Stephens 1993; *United States*: Metropolitan Life Insurance Company 1960 (elderly);Flegal et al. 1998* (1960s); Flegal et al. 1998* (1980s); Kabeer et al. 2001:129; Paeratakul et al. 2002:1206; Cleary et al. 2004:51* (middle aged) **OCEANIA** *New Zealand*: Simmons et al. 1996	**EUROPE** *Britain*: Hill & Roberts 1998:207 **NORTH AMERICA** *Canada*: Choiniere et al. 2000:S15; *United States*: CE Ross & Mirowsky 1983; Flegal et al. 1998; Klatsky & Armstrong 1991 (Asians); Lauderdale & Rathoug 2000
No signif. difference	**LATIN AMERICA** *Brazil*: Monteiro et al. 1995*	**LATIN AMERICA** *Brazil*: Monteiro et al. 1995*		**NORTH AMERICA** *United States*: Giammattei et al. 2003	**EUROPE** *Belgium*: Kornitzer & Bora 1989 **NORTH AMERICA** *United States*: Wingard et al. 1983 (Whites); DM Zuckerman et al. 1986 (college, using official standards); JK Mills & Cunningham 1988	
More in females			**EUROPE** *Britain*: Chinn & Rone 2001; *Germany*: Kromeyer-Hauschild et al. 1999; S Danielzik et al. 2004 (5-7 year olds); *Scotland*: Troiano & Flegal 1998; *Sweden*: IM Berg et al. 2001; S Petersen et al. 2003:850 **NORTH AMERICA** *United States*: Flegal et al. 2001; Kalies et al. 2002:1214 **OCEANIA** *Australia*: ML Booth et al. 1999*; Kirchengast & Steiner 2001	**OCEANIA** *Australia*: ML Booth et al. 1999*; Magarey et al. 2001	**ASIA** *China*: Popkin et al. 1995; *Russia*: Jahns et al. 2003 **EUROPE** *Belgium*: Moens et al. 1999; *Netherlands*: Berns 1995; *Spain*: Gutierrez-Fisac et al. 1995; *Sweden*: Kuskowska-Wolk & Bergstrom 1993a/1993b **NORTH AMERICA** *Canada*: Millar & Stephens 1993; *United States*: Metropolitan Life Insurance Company 1960 (elderly); US Dept of HEW 1965; US Dept of HEW 1975; Cleary et al. 2004:51* (young adult and elderly) **OCEANIA** *New Zealand*: Simmons et al. 1996	**LATIN AMERICA** *Brazil*: Y Wang et al. 2002:973 **NORTH AMERICA** *Canada*: Choiniere et al. 2000:S15; *United States*: CE Ross & Mirowsky 1983; Flegal et al. 1998; Klatsky & Armstrong 1991 (Orientals); Lauderdale & Rathouz 2000

1.2.2.3. Obesity

Obesity is usually defined in medical-scientific terms as having a body mass index (BMI) that is 30 or greater. According to most studies (Table 1.2.2.3), obesity is more common in females than in males, although several exceptions have been reported.

Table 1.2.2.3. Obesity.

Nature of Any Difference	Prepubertal			Postpubertal		Multiple Age Categories
			Childhood	Adolescent	Adult	
More in males			**LATIN AMERICA** *Chile*: Kain et al. 2002; Olivares et al. 2004:1281		**EUROPE** *Hungary*: Antal et al. 2003	**EUROPE** *Belgium*: Moens et al. 1999
No signif differ				**NORTH AMERICA** *United States*: Troiano & Flegal 1998	**EUROPE** *Belgium*: Kornitzer & Bara 1989; *Finland*: Pietinen et al. 1996 **OCEANIA** *Australia*: Bennett & Magnus 1994; *Mauritius*: Hodge 1996	**EUROPE** *Britain*: Hill & Roberts 1998:207
More in females			**EUROPE** *Britain*: Chinn & Rone 2001; *Germany*: Kromeyer-Hauschild et al. 1999 **NORTH AMERICA** *United States*: Kalies et al. 2002:1214	**EUROPE** *Germany*: Danielzik et al. 2004 (5-7 year olds) **OCEANIA** *Australia*: Magarey et al. 2001	**ASIA** *Russia*: Jahns et al. 2003 **EUROPE** *Italy*: Perissinotto et al. 2002 (elderly); *Poland*: Rogucka & Bielicki 1999:420 **MIDDLE EAST** *Israel*: Gofin et al. 1996 (elderly) **NORTH AMERICA** *United States*: S Abraham et al. 1975; Schoenborn et al. 1981; Flegal et al. 1988* (elderly); Paeratakul et al. 2002:1206; Murtagh & Hubert 2004:1409 (elderly)	**LATIN AMERICA** *Brazil*: Sichieri et al. 1994 **NORTH AMERICA** *United States*: National Center for Health Statistics 1981; C Power et al. 1997:1501; Flegal et al. 1998 **OCEANIA** *Western Samoa*: Hodge et al. 1994:421

1.2.2.4. Association Between Social Status and Being Overweight or Obese

Many studies have found that the prevalence of being overweight or obese is greater among persons of low social status than among those of high status, at least in developed countries (e.g., Register & Williams 1990; Gortmaker et al. 1993; Rosmond & Bjorntorp 1999; Paeratakul et al. 2002). As summarized in Table 1.2.2.4, a few studies have sought to determine if this status-overweight association is more pronounced in one sex than in the other. In all of these studies, the relationship was found to be stronger for females than for males.

Table 1.2.2.4. Association between social status and being overweight or obese.

Nature of Any Difference	Postpubertal
	Adult
More among males	
No signif. difference	
More among females	**EUROPE** *Britian:* Power et al. 1997:1502; *Finland*: Sarlio-Lahteenkorva & Lahela 1999; *France*: Maillard et al. 1999 **NORTH AMERICA** *United States*: RW Jeffrey et al. 1989; Leigh et al. 1992

1.2.2.5. Underweight

Although somewhat difficult to define, underweight can be determined by body mass index (BMI) and the body weight/desired weight (W/DW) ratio. Studies have not come to consistent conclusions regarding which gender is most likely to be underweight, although the available evidence seems to suggest that the proportion of males who are underweight becomes greater with age (Table 1.2.2.5).

Table 1.2.2.5. Underweight.

Nature of Any Difference	Sub-Adolescent			Postpubertal
	Infant	Toddler	Early Childhood	Adult
Males more				**ASIA** *China*: Y Wang et al. 2002:973* **LATIN AMERICA** *Brazil*: Y Wang et al. 2002:973*
No signif. difference				**NORTH AMERICA** *United States*: Wingard et al. 1983:167 (White)
Females more	**MIDDLE EAST** *Egypt*: Ahmed et al. 1981	**MIDDLE EAST** *Egypt*: Tekce 1990; *Jordan*: Doan & Bisharat 1990	**MIDDLE EAST** *Egypt*: Tekce & Shorter 1984	**NORTH AMERICA** *United States*: Paeratakul et al. 2002:1207

1.2.2.6. Percent Body Fat and Skinfold Thickness

Overall body fat is determined by the proportion of one's body that is comprised of fat (as opposed to muscle, nerves, and other nonfat tissue), much of which is found under the skin. Numerous studies have investigated sex differences in overall body fat and skinfold thickness. As shown in Table 1.2.2.6a, most studies of prepubertal humans have concluded that females have a greater proportion of body fat than do males.

Split-Table 1.2.2.6a. Percent body fat and skinfold thickness among prepubertals.

Nature of Any Difference	Prepubertal	
	Infant	Childhood
Males have more		
No signif. difference		**NORTH AMERICA** *United States*: EL Reynolds 1950*; GB Forbes & Hursh 1963:261*
Females have more	**EUROPE** *France*: Guihard-Costa et al. 1997 **NORTH AMERICA** *United States*: Gampel 1965; Oakley & Parsons 1977; G Farmer 1985 (skinfold thickness)	**ASIA** *China*: Li et al. 2005* **EUROPE** *Germany*: Mast et al. 1998 **NORTH AMERICA** *United States*: Gabbard & Tandy 1988:155 **OCEANIA** *New Zealand*: EC Rush et al. 2003:3

In the case of postpubertal humans, the findings are unanimous in concluding that females have a greater percent of body fat and/or skinfold thickness (Split-Table 1.2.2.6b).

Split-Table 1.2.2.6b. Percent body fat and skinfold thickness among postpubertals.

Nature of Any Difference					Postpubertal		Multiple Age Categories
					Adolescent	Adult	
Males have more						**RODENT** *Rat*: Cortright et al. 1997	
No signif. difference							
Females have more					**ASIA** *China*: Li et al. 2005* (early adolescence) **NORTH AMERICA** *United States*: EL Reynolds 1950*; Reba et al. 1968; Malina 1975; G Forbes 1987; Dai et al. 2002 **OCEANIA** *Australia*: Magarey et al. 1999:140	**EUROPE** *Denmark*: Roepstorff et al. 2002:E43b (young); *Sweden*: Hellstrom et al. 2000:459 **LATIN AMERICA** *Bahamas*: Mazess 1967 (Blacks) **NORTH AMERICA** *Canada*: Marliss et al. 2000:458; *United States*: CM Young et al. 1963; PE Watson et al. 1980 (young); SM Bailey & Katch 1981; AW Marshall et al. 1983; Goist & Sutker 1985; Considine et al. 1996; Sanborn & Jankowski 1994 (young); Haffner et al. 1996 (Mexican-American); Kwo et al. 1998:1554 (young); Pritzlaff et al. 1999; AS Jackson et al. 2002:791 **OCEANIA** *Australia*: A Wright et al. 2002 (young)	**EUROPE** *Netherlands*: Parizkova 1977 **NORTH AMERICA** *Canada*: Pascot et al. 2002:401; *United States*: GB Forbes & Hursh 1963:261; Pierson et al. 1974; Seltzer & Mayer 1965 **INTERNATIONAL** *Multiple Countries*: International Committee on Radiological Protection 1975

1.2.2.7. Body Fat Distribution in the Upper Body

Research indicates that male concentration of body fat is greater in the chest and shoulders than is true for females (Table 1.2.2.7).

Table 1.2.2.7. Body fat distribution in the upper body.

Nature of Any Difference							Multiple Age Categories
Males have more							**EUROPE** *France*: Vague 1947 **NORTH AMERICA** *United States*: Vague 1956; Kissebah et al. 1982; Krotkiewski et al. 1983; Bjorntorp 1984; Vague et al. 1988; Comuzzie et al. 1995 (Mexican Americans)
No signif. difference							
Females have more							

1.2.2.8. Body Fat Distribution in the Lower Body

At least among adolescents and adults, females have been shown to have more concentrated body fat in the hips and thighs than is true for males (Table 1.2.2.8).

Table 1.2.2.8. Body fat distribution in the lower body.

Nature of Any Difference							Multiple Age Categories
Males have more							
No signif. difference							
Females have more							**NORTH AMERICA** *United States*: Vague 1956; Kissebah et al. 1982; Bjorntorp 1984; Vague et al. 1988

1.2.2.9. Subcutaneous Fat/Amount of Body Fat

Subcutaneous fat is that which is stored in the fatty tissue under the skin (subcutaneous tissue) as opposed to that in the abdominal cavity (intra-abdominal tissue) and within the muscles – particularly in older adults. Table 1.2.2.9 suggests that at least for most age categories, females have more subcutaneous fat than do males.

Table 1.2.2.9. Subcutaneous fat/amount of body fat.

Nature of Any Difference	Prepubertal				Postpubertal		
	Infant	Toddler		Childhood	Adolescent	Adult	
More in males							
No signif. difference		**EUROPE** *Britain*: WH Hammond 1955:206*					
More in females	**EUROPE** *France*: Guihard-Costa et al. 2002 **NORTH AMERICA** *United States*: Stolz & Stolz 1951			**EUROPE** *Britain* WH Hammond 1955:206*	**EUROPE** *Britain*: WH Hammond 1955:206* **NORTH AMERICA** *United States*: DD Marino & King 1980	**RODENT** *Mouse*: Wiedmer et al. 2004:2861	

1.2.2.10. Waist-to-Hip Ratio

The waist-to-hip ratio is calculated by dividing the waist circumference by the hip circumference. Nearly all studies have concluded that the waist-to-hip ratio is greater for males than for females (Table 1.2.2.10).

Table 1.2.2.10. Waist-to-hip ratio.

Nature of Any Difference					Postpubertal		Multiple Age Categories
				Childhood	Adolescent	Adult	
Males higher				**EUROPE** *Germany*: Bottner et al. 2004:4054* (ages 8 to 11)	**EUROPE** *Germany*: Bottner et al. 2004:4054* (ages 12 to 18)	**ASIA** *Taiwan*: K.-C. Lin et al. 2004 (30 years and older) **EUROPE** *Germany*: Bottner et al. 2004:4054*(ages 8 to 18); *Italy*: Perissinotto et al. 2002 (elderly); *Netherlands*: Stolk et al. 1996:314; *Sweden*: Hellstrom et al. 2000:459; *Multiple European Countries*: Langerberg et al. 2003 (53 year olds) **NORTH AMERICA** *Canada*: Ledoux et al. 1997; *United States*: Cnop et al. 2003:461; Cleary et al. 2004:50	**NORTH AMERICA** *United States*: Epel et al. 1999:12; Pascot et al. 2002:401
No signif. difference							
Females higher						**NORTH AMERICA** *United States*: Comuzzie et al. 1993:730(Mexican Americans)	

1.2.2.11. Body Proportions in the Pelvic Region

According to Table 1.2.2.11, there may be various subtle sex differences in the pelvic structures of male and female rats.

Table 1.2.2.11. Body proportions in the pelvic region.

Nature of Any Difference					Postpubertal		
						Adult	
Greater in males						**RODENT** *Rat*: P Bernstein & Crelin 1967* (pelvic width, crest tuberosity distance, curvature of the ischial ramas, length of the ischium & the symphysis, vertebral level of the pubic symphis; width of the obturator foramen)	
No signif. difference							
Greater in females						**RODENT** *Rat*: P Bernstein & Crelin 1967* (subpubic angle)	

1.2.2.12. Relative Size of the Extremities

One study of monkeys found that the size of all basic extremities were greater in males than in females even after adjusting for sex differences in overall size (Table 1.2.2.12).

Table 1.2.2.12. Relative size of the extremities.

Nature of Any Difference					Postpubertal		
						Adult	
Greater in males						**PRIMATE (EXCEPT APE)** *Rhesus Monkey*: JA Vilensky 1979 (trunk, forearm, hand, leg, foot, and tail)	
No signif. difference							
Greater in females							

1.2.3. Weight Gain and Weight Loss

Sex differences in weight gain have been investigated for both humans and other animals under a variety of specified conditions.

1.2.3.1. Weight Gain With Age

In adulthood, nearly all humans gradually increase in weight with age. Table 1.2.3.1 indicates that the rate of gain tends to be more for females than for males.

Table 1.2.3.1. Weight gain with age.

Nature of Any Difference					Postpubertal		
						Adult	
Males gain more							
No signif. difference							
Females gain more						**EUROPE** *Denmark*: Heitmann 1991; *Finland*: Lahti-Koski et al. 2001 **NORTH AMERICA** *United States*: G Forbes & Reina 1970; Parizkowa 1973; Bray 1976; Enzi et al. 1986	

1.2.3.2. Weight Gain Associated With Depression

Persons who are depressed often experience significant weight gain. Most of the evidence pertaining to this phenomenon indicates that this type of weight gain is more characteristic of females than of males, although two studies found no significant sex difference (Table 1.2.3.2).

Table 1.2.3.2. Weight gain associated with depression.

Nature of Any Difference					Postpubertal	
						Adult
Males gain more						
No signif. difference						**NORTH AMERICA** *United States*: MA Young et al. 1990; Benazzi 1999
Females gain more						**EUROPE** *Italy*: Perugi et al. 1990 **NORTH AMERICA** *United States*: Kornstein et al. 1995; Kornstein et al. 2000; Khan et al. 2002 (among opposite sex twins)

1.2.3.3. Weight Gain Following Amygdaloidal Lesion

Several studies of rodents have found that a physically damaged amygdala results in greater weight gains among females than among males (Table 1.2.3.3).

Table 1.2.3.3. Weight gain following amygdaloidal lesion.

Nature of Any Difference					Postpubertal	
					Adolescent	Adult
Males gain more						
No signif. difference						
Females gain more					**RODENT** *Rat*: Pi et al. 1964	**RODENT** *Mouse*: MK Sanders et al. 1973; *Rat*: Bernardis et al. 1963; Singh & Meyer 1968; V Cox et at. 1969; D Singh 1970; Grossman & Hennessy 1976; BM King & Frohman 1986; BM King et al. 1999

1.2.3.4. Weight Gain Following Intermittent Starvation

One study subjected mice to periodic starvation. They found that when allowed to free feed afterward, males gained more weight than did females (Table 1.2.3.4).

Table 1.2.3.4. Weight gain following intermittent starvation.

Nature of Any Difference					Postpubertal	
						Adult
Males gain more						**RODENT** *Mouse*: T Robertson et al. 1934
No signif. difference						
Females gain more						

1.2.3.5. Weight Gain Following Ventromedial Hypothalamic (VMH) Lesion

Most experiments in which lesions were made in the ventromedial hypothalamus of rodents have found that females gain more weight than do males (Table 1.2.3.5).

Table 1.2.3.5. Weight gain following ventromedial hypothalamic (VMH) lesion.

Nature of Any Difference					Postpubertal	
					Adolescent	Adult
Males gain more						
No signif. difference						**RODENT** *Rat*: Rehonvsky & Wampler 1972 (young)
Females gain more					**RODENT** *Rat*: Pi et al. 1964	**RODENT** *Mouse*: MK Sanders et al. 1973 (young); *Rat*: D Singh & Meyer 1968 (young); VJ Cox et al. 1969 (young); Grossman & Hennessy 1976 (young); BM King & Frohman 1986 (young)

1.2.3.6. Weight Gain (BMI Increase) Following Induced Systolic Blood Pressure

One study concluded that females experience greater weight gain following systolic blood pressure inductions when compared to males (Table 1.2.3.6).

Table 1.2.3.6. Weight gain (BMI increase) following induced systolic blood pressure.

Nature of Any Difference						Postpubertal
						Adult
Males gain more						
No signif. difference						
Females gain more						**EUROPE** *Norway*: Wilsgraard et al. 2000

1.2.3.7. Weight Gain Following Cigarette Smoking Cessation

Cessation of smoking cigarettes has been linked to at least temporary weight gain by a sizable proportion of ex-smokers. Studies of sex differences have consistently found that this is more true for females than for males (Table 1.2.3.7). Even among rodents who were given nicotine over a long period of time and then withdrawn from the drug, females tended to gain more weight than did males.

Table 1.2.3.7. Weight gain following cigarette smoking cessation.

Nature of Any Difference							Multiple Age Categories
Males gain more							
No signif. difference							
Females gain more							**EUROPE** *Britain*: Grunberg 1985 **NORTH AMERICA** *United States*: Grunberg 1982; Wack & Rodin 1982; Grunberg & Morse 1984 **RODENT** *Rat*: Grunberg et al. 1984; Grunberg et al. 1986; Grunberg et al. 1987

1.2.3.8. Weight Loss with Regular Exercise

According to one study of humans and two of rodents, males are able to lose more weight by engaging in regular exercise than are females. A study of an elderly human population found no significant difference (Table 1.2.3.8).

Table 1.2.3.8. Weight loss with regular exercise.

Nature of Any Difference						Postpubertal
						Adult
Males lose more						**EUROPE** *Britain*: Stubbs et al. 2002 **RODENT** *Mouse*: Nance et al. 1977; Cortright et al. 1997
No signif. difference						**MIDDLE EAST** *Israel*: Carmeli et al. 2000 (12 week elderly exercise program)
Females lose more						

1.2.4. Musculature Factors

Findings from investigations pertaining to various aspects of musculature are summarized in the following tables.

1.2.4.1. Size of Muscle/Muscle Mass

Numerous studies have found that males have greater muscle mass than do females. This difference has been detected even when measuring infants as well as adults and has been found in several species besides humans (Table 1.2.4.1).

Table 1.2.4.1. Size of muscle/muscle mass.

Nature of Any Difference	Prepubertal				Postpubertal		Multiple Age Categories
	Infant					Adult	
Males greater	**NORTH AMERICA** *United States*: Garn 1957; Garn 1958					**ASIA** *Japan*: Kanehisa et al. 2003 (trained athletes) **EUROPE** *Britain*: AE Miller et al. 1993 (thicker muscle fibers); *Sweden*: Komi & Karlsson 1978 (young); Liljedahl et al. 1996 **NORTH AMERICA** *Canada*: Simoneau et al. 1985; *United States*: A Keys & Brozek 1953 (higher proportion of muscle mass); Andersen 1963 (higher proportion of muscle mass); Malina 1978 (higher proportion of muscle mass); HJ Green et al. 1984; Sale et al. 1987 (thicker muscle fibers); Esbjornsson et al. 1993; Sanborn & Jankowski. 1994 (young); Chow et al. 2000* (thicker leg muscle fibers; Nicolay & Walker 2005:607 (larger forearm circumference) **AMPHIBIAN** *Green Anole Lizard*: J Wade 1998 (ceratohyoid muscle); *Toad*: MT Lima-Landman & Lapa 1998 (sternodales forelimb muscle when equaled for body size) **CANINE** *Hyena*: NG Forger et al. 1996 (bulbocavernosus muscle) **RODENT** *Mouse*: Glenmark et al. 2004	**EUROPE** *Britain*: AE Miller et al. 1993
No signif. diff.							
Females greater						**NORTH AMERICA** *United States*: Chow et al. 2000* (leg muscle fiber length)	

1.2.4.2. Muscular Flexibility

In a relatively few studies of muscular flexibility, females have been shown to surpass males (Table 1.2.4.2).

Table 1.2.4.2. Muscular flexibility.

Nature of Any Difference					Postpubertal		
					Adolescent		
Males greater							
No signif. diff.							
Females greater					**EUROPE** *Poland*: Thurzova 1998 (hamstring) **NORTH AMERICA** *United States*: Bach et al. 1985 (hamstring); S Wang et al. 1993 (hamstring); Nyland et al. 2004 (hamstring)		

1.2.4.3. Muscle Strength

Given that males have greater muscle mass than females (see above), muscular strength is greater for males. Table 1.2.4.3 confirms this expectation.

Table 1.2.4.3. Muscle strength.

Nature of Any Difference	Pre-pubertal				Postpubertal		Multiple Age Categories
	Infant			Childhood	Adolescent	Adult	
Males greater	**NORTH AMERICA** *United States*: RQ Bell & Darling 1965 (lifting head higher when on stomach)			**ASIA** *Japan*: Kanehisa et al. 1994 (leg muscle)	**NORTH AMERICA** *United States*: Jones 1947 **OCEANIA** *Australia*: R Fletcher & Hattie 2005:663 (self-rated, weight lifting)	**EUROPE** *Britain*: Maughan et al. 1983 (stronger muscles); AE Miller et al. 1993; SK Phillips et al. 1993 (elderly); *France*: Ochala et al. 2004 (elderly, muscular torque); *Sweden*: Komi & Karlsson 1978; Liljedahl et al. 1996 **MIDDLE EAST** *Turkey*: Asci 2002:368 (young, self-rated) **NORTH AMERICA** *Canada*: Simoneau et al. 1985; JA Hall & Kimura 1995 (hand strength); *United States*: Aniansson et al. 1981 (elderly); HJ Green et al. 1984; Homant & Kennedy 1985 (upper body, police officers); Petersen et al. 1989 (grip strength); Doherty et al. 1993 (elderly); Esbjornosson et al. 1993; Hurley 1995 (elderly, grip); Bohannon 1997 (grip); Lindle et al. 1997; Sonstroem 1998 (young, self-rated strength); Oman et al. 1999 (lower body strength, elderly); Frontera et al. 2000 (elderly); Nevill & Holder 2000 (grip strength); Seeman 2001; Nicolay & Walker 2005 (grip strength) **RODENT** *Mouse*: Glenmark et al. 2004	**MIDDLE EAST** *India*: Padmavathi et al. 1999; Vaz et al. 2002 (grip) **NORTH AMERICA** *United States*: FW Smedley 1902 (grip)
No signif. difference							
Females greater							

1.2.4.4. Muscular Body Build (Mesomorphy/Broad Shoulders-Narrow Hips)

Numerous studies have documented that among humans males have a more muscular (mesomorphic) body build than do females, at least following the onset of puberty (Table 1.2.4.4). The muscular development of males is especially pronounced in the shoulder portions of the body. Similar evidence is available for nonhuman species as well.

Table 1.2.4.4. Muscular body build (mesomorphy/broad shoulders-narrow hips).

Nature of Any Difference	Prepubertal				Postpubertal		Multiple Age Categories
				Childhood	Adolescent		
Males more				**NORTH AMERICA** *United States*: M Phillips et al. 1955; Kirchner & Glines 1957; Branta et al. 1984*; M Jones et al. 1986	**MIDDLE EAST** *India*: Hauspie et al. 1985* **EUROPE** *Britain*: Hauspie et al. 1985*; *Germany*: Zeller 1939; Schmidt-Voight 1942 **NORTH AMERICA** *United States*: N Bayley 1943; K Simmons & Greulich 1943; Muhsam 1947; Branta et al. 1984*		**AMPHIBIAN** *Frog*: Sassoon & Kelley 1986; Sassoon et al. 1987 **RODENT** *Rat*: Breedlove & Arnold 1983a; Breedlove & Arnold 1983b
No signif. difference				**NORTH AMERICA** *United States*: K Simmons & Greulich 1943			
Females more							

1.2.4.5. Muscle Sympathetic Nerve Activity

Males have been found to exhibit greater muscle sympathetic nerve activity than females (Table 1.2.4.5).

Table 1.2.4.5. Muscle sympathetic nerve activity.

Nature of Any Difference					Postpubertal		
						Adult	
Male nerves more sympathetic						**NORTH AMERICA** *United States*: Ng et al. 1993 (at rest)*; PP Jones et al. 1996a (young); PP Jones et al. 1996b (young)	
No significant difference							
Female nerves more sympathetic							

1.2.4.6. Muscular Endurance

Two studies have found the muscular endurance of males surpassing that of females (Table 1.2.4.6).

Table 1.2.4.6. Muscular endurance.

Nature of Any Difference					Postpubertal		
						Adult	
Males more						**EUROPE** *Britain*: AE Miller et al. 1993 (isometric contractions at low to moderate intensity); Maughan et al. 1986 (isometric contractions at low to moderate intensity)	
No significant difference							
Females more							

1.2.4.7. Muscle Fatigue Resistance

In several studies, females swere found to exhibit greater resistance to muscle fatigue than males (Table 1.2.4.7).

Table 1.2.4.7. Muscle fatigue resistance.

Nature of Any Difference					Postpubertal		
						Adult	
Male more							
No significant difference							
Females more						**EUROPE** *Finland*: Hakkinen 1993; *Sweden*: Linnamo et al. 1998 **NORTH AMERICA** *United States*: Fulco et al. 1999 **RODENT** *Mouse*: Glenmark et al. 2004	

1.2.4.8. Size of Bulbocavernosus Muscles

The spinal nucleus of the bulbocavernous pertains to muscles in the groin area. Table 1.2.4.8 shows that at least among rats, this muscle tissue is considerably larger in males than in females.

Table 1.2.4.8. Size of bulbocavernosus muscles.

Nature of Any Difference	Postpubertal
	Adult
Males larger	**RODENT** *Rat*: MC Crark et al. 1993 (spinal nucleus larger); Hays et al. 1993 (spinal nucleus larger); Mills & Sengelaub 1993 (spinal nucleus larger)
No significant difference	
Females larger	

1.2.5. Other Morphological Traits

Morphological traits are ones having to do with one's body structure. A couple of specific morphologic traits (apart from those pertaining to body size, which has already been considered) have been investigated with respect to sex differences and are reviewed below.

1.2.5.1. Dermal Ridge Count

The number of ridges in one's finger prints is referred to as the dermal ridge count. One study found no significant gender difference in this count, while a more recent study found males with a count that surpassed that of females (Table 1.2.5.1).

Table 1.2.5.1. Dermal ridge count.

Nature of Any Difference	Postpubertal
	Adult
Males greater	**NORTH AMERICA** *Canada*: Kimura & Carson 1993 (young)
No signif. difference	**NORTH AMERICA** *United States*: Holt 1968 (young)
Females greater	

1.2.5.2. Galvanic Skin Response (GSR, Skin Conductivity)

One physical symptom of nervousness is the degree to which individuals sweat. An instrument known as the Galvanic Skin Response (GSR) measures the degree of sweating in the palms. The devise works by using the hand to complete an electrical circuit when two fingers are placed on two unconnected electrodes. The electrical current is so small that it is not detectable to subjects. The more one sweats, the more rapidly the electrical current flows.

A few studies have sought to determine if a gender difference exists in the GSR. As shown in Table 1.2.5.2, most studies indicate that females register a higher GSR than males, although a few studies indicate that the answer may depend on detailed circumstances under which tests were conducted.

Table 1.2.5.2. Galvanic skin response (GSR, skin conductivity).

Nature of Any Difference	Prepubertal			Postpubertal	Multiple Age Categories
	Infant	Early Childhood	Childhood	Adult	
Males higher			**NORTH AMERICA** *United States*: Fabes et al. 1994 (when watching a disturbing film)	**EUROPE** *Britain*: Evans & Steptoe 2003:765* (normal resting nonstressed)	
No signif. difference					
Females higher	**NORTH AMERICA** *United States*: GM Weller & Bell 1965 (neonate)	**NORTH AMERICA** *United States*: Zahn-Waxler et al. 1995 (when distressed)	**NORTH AMERICA** *United States*: Riggness 1962; Eisenberg et al. 1991b (in response to sympathy-inducing stimuli)	**EUROPE** *Britain*: Evans & Steptoe 2003:765* (when stressed); *Norway*: Johnsen et al. 1995 (in response to emotional facial expressions) **NORTH AMERICA** *United States*: MM Bradley et al. 2001 (in response to aversive visual stimulation)	**NORTH AMERICA** *Canada*: VJ Knott 1984

1.2.5.3. Skin Conductivity Baseline Recovery

According to the one study located, skin conductivity of males was slower to return to baseline after being elevated due to stress than was the case for females (Table 1.2.5.3).

Table 1.2.5.3. Skin conductivity baseline recovery.

Nature of Any Difference	Prepubertal
	Childhood
Males longer	**NORTH AMERICA** *United States*: Fabes 1994
No signif. difference	
Females longer	

1.2.5.4. Finger Length/Hand Size

Given that adult males are larger than adult females, it is to be expected that the fingers of males would be larger than those of females, and is thus indicated by the one available study (Table 1.2.5.4).

Table 1.2.5.4. Finger length/hand size.

Nature of Any Difference	Postpubertal
	Adult
Males larger	**NORTH AMERICA** *Canada*: JA Hall & Kimura 1995 (finger length); *United States*: Nicolay & Walker 2005:607 (hand size)
No signif. difference	
Females larger	

1.2.5.5. 2D:4D Ratio (Length of the 2nd Digit Relative to the 4th Digit)

At least among humans, exposing the fetus to high (male-typical) levels of testosterone during critical stages in development appears to lengthen the second digit relative to the fourth digit (especially on the left hand). Consistent with this evidence on the effects of testosterone, Table 1.2.5.5 indicates that males on average have a longer second digit relative to their fourth digit when compared to females. It is notable that the one study to report the opposite pattern was confined to rodents.

Table 1.2.5.5. 2D:4D Ratio (length of the 2nd digit relative to the 4th digit).

Nature of Any Difference	Prepubertals	Postpubertal	Multiple Age Categories
	Childhood	Adult	
Males have longer 2nd D than 4th D	**EUROPE** *Britain*: Buck et al. 2003 **MIDDLE EAST** *Turkey*: Okten et al. 2002	**ASIA** *Russia*: Wolotzkoi 1924; Huizinga 1949 **EUROPE** *Britain*: JT Manning et al. 1998; JT Manning & Bundred 2000; Sluming & Manning 2000; *Germany*: Ecker 1875; Weissenberg 1895 **NORTH AMERICA** *Canada*: M Peters et al. 2002 (college); *United States*: F Baker 1888; George 1930; VR Phelps 1952; Lippa 2003	**INTERNATIONAL** *Multiple Countries*: JT Manning et al. 2000
No signif. difference			
Females have longer 2nd D than 4th D			**RODENT** *Rat*: WM Brown et al. 2001

1.2.5.6. Relationship Between 2D:4D and Facial Asymmetry

A study of sex differences in the relationship between the 2D:4D ratio and the degree of facial asymmetry indicated that it was positive in the case of females and negative in the case of males (Table 1.2.5.6).

Table 1.2.5.6. Relationship between 2D:4D and facial asymmetry.

Nature of Any Difference	Postpubertal
	Adult
Males more	**EUROPE** *Austria:* Fink et al. 2004* (negative related to facial asymmetry in males) (LE)
No signif. difference	
Females more	**EUROPE** *Austria:* Fink et al. 2004* (positive related to facial asymmetry in males) (LE)

1.3

INTERNAL ORGANS AND BODILY STRUCTURES (EXCEPT THE BRAIN)

In this section, a number of variables are discussed that have to do with structures such as the teeth, bones, and skin. Also covered are factors that have to do with glands and other bodily organs.

1.3.1. Teeth

Variables pertaining to teeth structures as well as to the age at which teeth erupt and decay are discussed below.

1.3.1.1. Teeth Calcification

The only study located concerning teeth calcification concluded that it is more pronounced (with age control) and occurs earlier in females than in males (Table 1.3.1.1).

Table 1.3.1.1. Teeth calcification.

Nature of Any Difference	Prepubertal						
				Childhood			
Males more							
No signif. difference							
Females more				**NORTH AMERICA** *United States*: Demirjian 1978			

1.3.1.2. Appearance of Permanent Dentition, Age at

In humans, the permanent (adult) teeth nearly always appear prior to the onset of puberty. As to whether males or females received their permanent teeth earlier, the evidence is conflicting. In Table 1.3.1.2, two studies suggest that this occurs sooner among females and one study indicated the opposite.

Table 1.3.1.2. Appearance of permanent dentition, age at.

Nature of Any Difference	Citations
Earlier for males	**NORTH AMERICA** *United States*: White House Conference 1932
No signif. difference	
Earlier for females	**NORTH AMERICA** *United States*: P Cattell 1928; H Klein et al. 1937

1.3.1.3. Canine Tooth Length

The length of the canine tooth is measured with a ruler (usually calibrated in meters). Table 1.3.1.3 suggests that in humans, in their distant extinct ancestors (the Australopithecus), and in other primate species, males have significantly longer canine teeth than do females.

Table 1.3.1.3. Canine tooth length.

Nature of Any Difference					Postpubertal		Multiple Age Categories
						Adult	
Males larger						**PRIMATE (EXCEPT APE)** *Brown Capuchins*: Masterton 2003; *Colobus Monkey*: Hayes et al. 1995 (black & white); *Golden Monkey*: Pan & Oxnard 2001; *Snub-Nosed Monkey*: Jablonoski & Ruliang 1995 (four species); *Vervet Monkeys*: NM Durham 1969	**OCEANIA** *Australia*: Gingerich 1981 **HOMINID** *Australopithecus*: Fleagle et al. 1980; Fedigam 1982 **MULTIPLE SPECIES** *Several Primate (except ape) Species*: Leutenegger 1982* (39/42 species); RF Kay et al. 1988
No signif. difference						**PRIMATE (EXCEPT APE)** *Ring-Tailed Lemur*: Sauthes et al. 2001; *Sifaka*: Lawler et al. 2005 (wild caught); *Talapoin*: Segre 1970	**MULTIPLE SPECIES** *Several Primate (except ape) Species*: Leutenegger 1982* (3/42 species)
Females larger							**PRIMATE (EXCEPT APE)** *Lemur*: Kappeler 1996

1.3.1.4. Diameter of Dental Crown

As shown in Table 1.3.1.4, the dental crown of males is larger than that of females. One research team asserted that the gender difference is between 5 to 10% (Yamada & Sakai 1992).

Table 1.3.1.4. Diameter of dental crown.

Nature of Any Difference							Multiple Age Categories
Larger for males							**EUROPE** *Finland*: Alvesalo 1971 **NORTH AMERICA** *United States*: Garn et al. 1967a; Garn et al. 1967b **OCEANIA** *Cook Island*: Yamada & Sakai 1992
No signif. difference							
Larger for females							

1.3.2. Bones and Joints

Research on gender differences in the bones considers such factors as density and the rates at which they grow.

1.3.2.1a. Bone Density/Bone Mass

Among humans, while the bone density of males and females appear to be equivalent among prepubertals, within a few years following puberty, nearly all studies have found males exhibiting greater bone density than females (Split-Table 1.3.2.1a).

Split-Table 1.3.2.1a. Bone density/bone mass.

Nature of Any Difference	Prepubertal				Postpubertal			Multiple Age Categories
				Childhood	Adolescent		Adult	
					Early	Late		
Males greater						**NORTH AMERICA** *United States*: Bachrach et al. 1999; Bonjour et al. 1991; Theintz et al. 1992; Gunnes 1994 (bone mineral content); K Rubin et al. 1993* (bone mineral content) **OCEANIA** *Australia*: Magarey et al. 1999:141 (higher bone mineral content)	**ASIA** *China*: Yan et al. 2002* (elderly); Lei et al. 2004:73 (elderly) **EUROPE** *Denmark*: Mosekilde & Mosekilde 1990; *Poland*: Rogucka et al. 2000* (young); Rogucka et al. 2000*; *Spain*: Diaz Curiel et al. 1997 **NORTH AMERICA** *United States*: Jansson et al. 1983; Aaron et al. 1987; Greenspan et al. 1994 (bone mineral density, elderly); RA Faulkner et al. 1995 (elderly); Gallagher et al. 1997; Greendale et al. 1997 (elderly); YM Henry & Eastell 2000 (young); Janssen et al. 2000; Orwoll 2000; Looker et al. 2001; Orwoll et al. 2001*; Seeman 2001; Naganathan et al. 2002; EL Duncan et al. 2003; Kammerer et al. 2003 (Mexican Americans); Karasik et al. 2003:311; Stini 2003:41 (middle age & elderly); Taafee et al. 2003 (elderly); Masi et al. 2004 (elderly); Nicolay & Walker 2005 (wrist circumference) **OCEANIA** *Australia*: Duan et al. 2001:2270 (vertebra)	**ASIA** *Japan*: Sakaue 1998 **EUROPE** *Italy*: Foresta et al. 1983a; Foresta et al. 1983b **NORTH AMERICA** *United States*: Riggs et al. 1981 (bone mineral density)
No signif. difference				**NORTH AMERICA** *United States*: K Rubin et al. 1993* (bone mineral content)	**NORTH AMERICA** *United States*: Gilsanz et al. 1988; K Rubin et al. 1993* (bone mineral content)		**ASIA** *China*: Yan et al. 2002* (middle age)	
Females greater								

1.3.2.1b. Bone Density/Bone Mass for Nonhumans

According to Split-Table 1.3.2.1b, the evidence is somewhat inconsistent among rats regarding any sex difference in bone density or mass. Among the few studies of primates, however, findings all suggest that males surpass females in bone density and mass.

Split-Table 1.3.2.1b. Bone density/bone mass for nonhumans.

Nature of Any Difference					Postpubertal			Multiple Age Categories
					Adolescent		Adult	
						Late		
Males greater						**RODENT** *Rat*: XZ Zhang et al. 1999; Schoenau et al. 2001	**PRIMATE (EXCEPT APE)** *Baboon*: Havill et al. 2003; *Rhesus Macaque*: Colman et al. 1999 **RODENT** *Mouse*: Orwoll et al. 2001*; *Rat*: Vanderschueren et al. 1994* (femoral bone mass and area); BT Kim et al. 2003	**PRIMATE (EXCEPT APE)** *Baboon*: Kammerer et al. 1995; *Rhesus Macaque*: NS Pope et al. 1989; A Black et al. 2001
No signif. difference							**RODENT** *Rat*: Vandershueren et al. 1994* (femoral bone-cortical bone density)	
Females greater						**RODENT** *Rat*: DL DeMoss & Wright. 1998* (adolescent/adult skeletal mass & calcium content)	**RODENT** *Rat*: DL DeMoss & Wright 1998* (adolescent/adult skeletal mass & calcium content)	

1.3.2.2. Size of Skeletal Angles/Skeletal Structure/Skeletal Features

The quadriceps angle (Q angle) is determined by drawing one line from the anterior superior iliac spine through the center of the patella and a second line from the center of the patella through the tibial tuberosity. It is primarily affected by the width of the pelvis. As shown in Table 1.3.2.2, females have been found to have a more pronounced Q angle than males.

Table 1.3.2.2. Size of skeletal angles/skeletal structure/skeletal features.

Nature of Any Difference					Postpubertal	
						Adult
Males larger/more pronounced						
No signif. diff.						
Females larger/more pronounced						**NORTH AMERICA** *United States*: MG Horton & Hall 1989 (quadriceps angle); Csintalan et al. 2002:262 (quadriceps angle)

1.3.2.3. Size of Specific Bone and Cartilage Regions

Regarding bone and cartilage thus far investigated, those of male humans and amphibians have been found to be larger than those of females following puberty. One study of prepubertal mice reached the opposite conclusion (Table 1.3.2.3).

Table 1.3.2.3. Size of specific bone and cartilage regions.

Nature of Any Difference	Prepubertal				Postpubertal	
		Childhood				Adult
Males larger/more pronounced						**NORTH AMERICA** *United States*: AT Rezcallah et al. 2001 (inner & outer pedicle widths of cervical 3-7) **AMPHIBIAN** *Green Anole Lizard*: J Wade 1998 (2nd cerato branchial cartilage)
No signif. diff.						
Females larger/ more pronounced		**RODENT** *Mouse*: T Iguchi et al 1989 (30 days old, pelvis longer & thinner)				

1.3.2.4. Loss of Bone Density

Research has consistently shown that females lose more bone density with age than do males (Table 1.3.2.4). When this loss reaches such an extent that bones fracture easily, the condition is known as osteoporosis, an illness covered in Chapter 3.

Table 1.3.2.4. Loss of bone density.

Nature of Any Difference					Postpubertal	
						Adult
Males higher						
No signif. diff.						
Females higher						**NORTH AMERICA** *United States*: BL Riggs et al. 1981 (elderly, net bone loss); Ruff & Hayes 1983 (elderly, Pecos Pueblo Indian Tribe); Ruff & Hayes 1988 (elderly); SM Garn et al. 1992 (net bone loss); Duan et al. 2001a (elderly, vertebrae) **OCEANIA** *Australia*: Feik et al. 1996; Duan et al. 2001b (net bone loss)

1.3.2.5. Bone-Specific Alkaline Phosphatase (Bone ALP)

Findings have been mixed with respect to any sex differences in the concentration of alkaline phosphatase in the bones (Table 1.3.2.5).

Table 1.3.2.5. Bone-specific alkaline phosphatase (bone ALP).

Nature of Any Difference					Postpubertal	
						Adult
Males higher						**EUROPE** *Greenland*: Minisola et al. 2002; Rejnmark et al. 2004
No signif. difference						
Females higher						**ASIA** *China*: Yan et al. 2002 (elderly)

1.3.2.6. Joint Laxity

Joint laxity refers to the degree to which the joints are flexible. Studies have consistently shown such laxity to be greater in females than in males (Table 1.3.2.6).

Table 1.3.2.6. Joint laxity.

Nature of Any Difference	Sub-Adolescent				Postpubertal		
				Childhood	Adolescent	Adult	
Males higher							
No signif. difference							
Females higher				**EUROPE** *Sweden*: Jansson et al. 2003:1203*	**EUROPE** *Sweden*: LG Larsson et al. 1987; Jansson et al. 2003:1203*	**AFRICA** *Western Africa:* Beighton et al. 1973; Birrell et al. 1994 **EUROPE** *Britain*: N Hudson et al. 1995; *Sweden*: LG Larsson et al. 1993 **MIDDLE EAST** *Iraq*: Al-Rawi et al. 1985 (college) **NORTH AMERICA** *United States*: HA Bird et al. 1978; Jessee et al. 1980	

1.3.3. Skin

Variables pertaining to the skin include melanin levels, sun tanning rates, and the probability of being sun burned.

1.3.3.1. Skin Darkness (Melanin Index)

The darkness of human skin is primarily determined by the prevalence of melanin pigmentation. Numerous studies on gender differences in pigmentation have concluded that males have darker skin pigmentation than do females (Table 1.3.3.1).

Table 1.3.3.1. Skin darkness (melanin index).

Nature of Any Difference					Postpubertal		Multiple Age Categories
				Childhood		Adult	
Males				**NORTH AMERICA** *United States*: Relethford et al. 1985 (Irish ancestry)		**AFRICA** *Algeria*: Chamla & Demoulin 1978; *Ethiopia*: Harrison et al. 1969; *Nigeria*: Barnicot 1958 (Blacks); *South Africa*: Tobias 1961 (mulottos); Wassermann & Heyl 1968 **ASIA** *India*: Banerjee et al. 1983; *Tibet*: Kalla & Tiwari 1970 **EUROPE** *France*: Mesa 1983; *Greenland*: Thalbitzer 1914 (aboriginal); *Netherlands*: Rigters-Aris 1973 **LATIN AMERICA** *Bahamas*: Mazess 1967 (Blacks); *Brazil*: Harrison & Salzano 1966 (Guarni Indians); Harrison et al. 1967; *Mexico*: GW Lasker 1954 (Mestizos); Relethford & Lees 1981 (Tlaxcaltecans) **MIDDLE EAST** *Israel*: Hulse 1968 (Yemenite Jews) **NORTH AMERICA** *United States*: Hrdlicka 1922; EA Edwards & Duntley 1939; Garn et al. 1956; Pollitzer et al. 1970 (Seminole Indians); Harburg et al. 1978; JK Wagner et al. 2002:388 (Whites) **OCEANIA** *French Polynesia*: Harburg et al. 1982; *New Guinea*: P Clark et al. 1981 (twins); RG Harvey 1985 **INTERNATIONAL** *Various Middle Eastern Countries*: Sunderland 1979	**AFRICA** *South Africa*: JS Weiner et al. 1964 **ASIA** *Japan*: Mori & Tokuhashi 1956 (twins); Harvey & Lord 1978 (ainu); *Tibet*: Kalla 1973 **EUROPE** *Britain*: Kahlon 1976 (immigrants from India) **LATIN AMERICA** *Belize*: Byard & Lees 1982; *Equador*: Conway & Baker 1972 **NORTH AMERICA** *United States*: Sunderland & Woolley 1982 (immigrants from Wales) **OCEANIA** *Fujii*: Hyades & Deniker 1891 (postpubertals); *New Guinea*: RJ Walsh 1964 **INTERNATIONAL** *Various Pacific Islands*: RJ Walsh 1963
No signif. difference						**NORTH AMERICA** *United States*: JK Wagner et al. 2002:388 (Hispanics & East Asians)	
Females							

1.3.3.2. Tanning of the Skin due to Sun Exposure

According to a few studies, males tan more readily than females do when their skin is exposed to the sun, although the differences have not always been found to be statistically significant (Table 1.3.3.2). Otherwise stated, most research has indicated that females exhibit greater skin reflectance than is true for males.

Table 1.3.3.2. Tanning of the skin due to sun exposure.

Nature of Any Difference					Postpubertal				Multiple Age Categories
								Adult	
Males more readily									**ASIA** *Korea*: Roh et al. 2001 **LATIN AMERICA** *Peru*: Conway & Baker 1972 (Quechua Indians) **OCEANIA** *Papua New Guinea*: RG Harvey 1985 **INTERNATIONAL** *Multiple Countries*: Tobias 1961
No signif. difference								**EUROPE** *Sweden*: Lock-Andersen et al. 1998 **INTERNATIONAL** *Multiple Countries*: Nordlund & Ortonne 1998	**NORTH AMERICA** *United States*: JK Wagner et al. 2002:388 (Whites, Hispanics, East Asians)
Females more readily									

1.3.3.3. Skin Color, Individual Variations in

According to two studies, males exhibit greater variation between individual variations in skin color than do females (Table 1.3.3.3).

Table 1.3.3.3. Skin color, individual variations in.

Nature of Any Difference					Postpubertal	
						Adult
Males more						**LATIN AMERICA** *Bahamas*: Mazess 1967 (Blacks) **NORTH AMERICA** *United States*: Pollitzer et al. 1970 (Seminole Indians)
No signif. difference						
Females more						

1.3.3.4. Skin Burning From Sun Exposure

One study of three racial/ethnic groups living in the United States concluded that females were more prone to sun burning than were males, although the differences were statistically significant only for Whites and Hispanics (Table 1.3.3.4).

Table 1.3.3.4. Skin burning from sun exposure.

Nature of Any Difference					Postpubertal	
						Adult
Males						
No signif. difference						**NORTH AMERICA** *United States*: JK Wagner et al. 2002:388 (East Asians)
Females						**NORTH AMERICA** *United States*: JK Wagner et al. 2002:388 (Whites & Hispanics)

1.3.3.5. Dewlap, Size of

The dewlap is a loose fold of skin hanging beneath the chin that is primarily found among various species of lizards. As shown in Table 1.3.3.5, the dewlap tends to be larger in males than in females.

1.3.3.5. Dewlap, size of.

Nature of Any Difference					Postpubertal	
						Adult
Larger in males						**AMPHIBIAN** *Anolis Corolinensis*: TA Jenssen et al. 2000; *Green Anole Lizard*: J Wade 1998
No signif. difference						
Larger in females						

1.3.4. Other Organs and Structures

Over the years, quite a few studies have compared the size and various other aspects of the internal organs of males and females. Results are summarized below.

1.3.4.1. Adrenal Glands, Size of

Three studies in rodents all concluded that under a variety of conditions, larger adrenal glands were found in females than in males (Table 1.3.4.1).

Table 1.3.4.1. Adrenal glands, size of.

Nature of Any Difference	Multiple Age Categories
Larger in males	
No signif. difference	
Larger in females	**RODENT** *Rat*: Critchlow et al. 1963; Kitay 1963; Cowley & Griesel 1966 (resulting from prenatal protein deprivation)

1.3.4.2. Heart's Left Ventricle Wall, Size of

In both humans and rats, the left ventricle wall of the heart has been found to be thicker in females than in males (Table 1.3.4.2).

Table 1.3.4.2. Heart's left ventricle wall, size of.

Nature of Any Difference	Postpubertal
	Adult
Thicker in males	
No signif. difference	
Thicker in females	**EUROPE** *Britain*: P Douglas et al. 1995; *Poland*: Kostkiewicz et al. 1999 **NORTH AMERICA** *United States*: Dannenberg et al. 1989 (young); Giada et al. 1998 (young); JJ Morris et al. 1994; J Carroll et al. 1992 (elderly) **RODENT** *Rat*: Shreiner et al. 1969 (young); Schaibe & Scheuer 1984 (young); Malhotra et al. 1990 (young)

1.3.4.3. Inner Ear Structures, Size of

The inner ear helps to maintain balance. According to one study, males have inner ear structures that are larger than the same structures in females (Table 1.3.4.3). At least one study (Tremblay et al. 2004) indicated that this sex difference could help to explain why males are better than females at a spatial reasoning test called the rod-and-frame test, which requires subjects to position a rod vertically within a visual environment that is tilted (discussed in Chapter 5).

Table 1.3.4.3. Inner ear structures, size of.

Nature of Any Difference	Multiple Age Categories
Larger in males	**NORTH AMERICA** *United States*: Sato et al. 1992 (otolith & superior semicircular canal of the vestibular system)
No signif. difference	
Larger in females	

1.3.4.4. Pharynx, Size of

The pharynx is a fibromuscular tube that extends from the base of the skull to the throat (at which point it becomes the esophagus). One study found the pharynx of males to be larger than that of females (Table 1.3.4.4).

Table 1.3.4.4. Pharynx, size of.

Nature of Any Difference	Postpubertal
	Adult
Males larger	**NORTH AMERICA** *United States*: Mohsenin 2001
No signif. difference	
Females larger	

1.3.4.5. Anal-Genital Distance

Studies measuring the anal-genital distances of male and female rats show that males have a greater anal-genital distance than females (Table 1.3.4.5).

Table 1.3.4.5. Anal-genital distance.

Nature of Any Difference	Postpubertal
	Adult
Males larger	**RODENT** *Rat*: Dahlof et al. 1977; Faber & Hughes 1992; Keshet & Weinstock 1995
No signif. difference	
Females larger	

1.3.4.6. Kidney, Size of

One study compared the kidneys of male and female hamsters, and concluded that there were no differences in size (Table 1.3.4.6).

Table 1.3.4.6. Kidney, size of.

Nature of Any Difference	Postpubertal
	Adult
Males larger	
No signif. difference	**RODENT** *Hamster*: JM Feldman & Gerritson 1988 (diabetic, Chinese hamster)
Females larger	

1.3.4.7. Larynx, Vocal Cords/Tracks, Size of

While studies have found no significant sex differences in vocal cord size prior to adolescence, numerous studies have documented that the vocal cords are larger in males than females following puberty (Table 1.3.4.7).

Table 1.3.4.7. Larynx, vocal cords/tracks, size of.

Nature of Any Difference	Prepubertal			Postpubertal		Multiple Age Categories
	Infant	Early Childhood	Childhood	Adolescent	Adult	
Larger in males				**EUROPE** *Britain*: Cruttenden 1986 (following puberty)* **NORTH AMERICA** *United States*: Pedrey 1945; Klock 1968*; Kahane 1978*; Kahane 1980; Hirano et al. 1983*; Fitch & Giedd 1999* (vocal track); Lee et al. 1999 (vocal tracks); TL Perry et al. 2001* (following puberty)	**EUROPE** *Britain*: Crystal 1982 (vocal cords) **NORTH AMERICA** *United States*: Peterson & Barney 1952 (vocal tracks); Ladefoged & Broadbent 1957 (vocal tracks); Maue 1971; Laver & Trudgill 1979 (vocal tracks); Cruttenden 1986 (vocal cords); Titze 1989; Klatt & Klatt 1990; Ohde & Sharf 1992 (vocal cords); Tecumseh Fitch & Giedd 1999 (vocal tracks)	**NORTH AMERICA** *United States*: Tecumseh Fitch & Giedd 1999*
No signif. difference	**NORTH AMERICA** *United States*: Noback 1925; Negus 1929; Klock 1968*	**NORTH AMERICA** *United States*: Klock 1968*	**EUROPE** *Britain*: Cruttenden 1986 (in childhood)* **NORTH AMERICA** *United States*: Kahane 1978*; Hirano et al. 1983*; Fitch & Giedd 1999*; TL Perry et al. 2001* (in childhood)			
Larger in females						

1.3.4.8. Stiffness of Larynx

Two studies of the larynx concluded that females have a stiffer structure than do males (Table 1.3.4.8).

Table 1.3.4.8. Stiffness of larynx.

Nature of Any Difference	Multiple Age Categories
Males larger	
No signif. difference	
Females larger	**NORTH AMERICA** *United States*: Netsell et al. 1991; Stathopoulos & Sapienza 1997

1.3.4.9. Liver, Size of

Most studies have concluded that the size of the liver in males is significantly larger than the liver in females (Table 1.3.4.9).

Table 1.3.4.9. Liver, size of.

Nature of Any Difference	Prepubertal	Postpubertal
	Early Childhood	Adult
Males larger	**ASIA** *Japan*: Tominga et al. 1995	**ASIA** *Japan*: Oshibuchi et al. 1991; Kawai et al. 1995 **EUROPE** *Italy*: Lonardo & Trande 2000
No signif. difference		**NORTH AMERICA** *United States*: Kwo et al. 1998:1554 (young)
Females larger		

1.3.4.10. Lung (Breathing) Capacity

Numerous studies have concluded that the lung capacity of the average male is significantly greater than that of the average female (Table 1.3.4.10).

Table 1.3.4.10. Lung (breathing) capacity.

Nature of Any Difference	Prepubertal		Postpubertal	
	Infant	Childhood	Adolescent	Adult
Males more	**NORTH AMERICA** *United States*: Tepper et al. 1986	**NORTH AMERICA** *United States*: JA Gilbert 1893:75*; JA Gilbert 1894*; JA Gilbert 1897*; FW Smedley 1902*	**NORTH AMERICA** *United States*: JA Gilbert 1893:75*; JA Gilbert 1894*; JA Gilbert 1897*; FW Smedley 1902*; Kanner et al. 1994*; DR Gold et al. 1996	**EUROPE** *Britain*: Britton et al. 1994 **NORTH AMERICA** *United States*: Kanner et al. 1994*
No signif. difference				
Females more				

1.3.4.11. Age of Reaching Maximum Lung Capacity

One study concluded that females reach their maximum lung capacity at significantly younger ages than did males (Table 1.3.4.11).

Table 1.3.4.11. Age of reaching maximum lung capacity.

Nature of Any Difference	Postpubertal
	Adolescent
Males earlier	
No signif. difference	
Females earlier	**NORTH AMERICA** *United States*: Becklake & Kauffman 1999

1.3.4.12. Mammary Glands, Size of

One study concluded that the mammary glands in the opossum were larger in females than in males from birth onward (Table 1.3.4.12).

Table 1.3.4.12. Mammary glands, size of.

Nature of Any Difference	Multiple Age Categories
Larger in males	
No signif. difference	
Larger in females	**MARSUPIAL** *Opossum*: Renfree et al. 1990 (from birth through adolescence)

1.3.4.13. Syrinx, Size of

The syrinx is the main anatomical source of song in bird species. It is the avian equivalent of the mammalian larynx (or voice box). As shown in Table 1.3.4.13, male zebra finches have larger syrinxes than do their female counterparts.

Table 1.3.4.13. Syrinx, size of.

Nature of Any Difference							Multiple Age Categories
Larger in males							**BIRD** *Zebra Finch*: Taber 1964; Luine et al. 1980; Adkins-Regan 1981; J Wade & Arnold 1996; Springer & Wade 1997; J Wade et al. 1999:143; Wade & Buhlman 2000 (syrinx & accompanying muscle fibers)
No signif. difference							
Larger in females							

1.3.4.14. Upper Airway Passages

According to the available evidence, males have larger upper airway passages than do females (Table 1.3.4.14).

Table 1.3.4.14. Upper airway passages.

Nature of Any Difference					Postpubertal	
						Adult
Males larger						**EUROPE** *Britain*: Thurnheer et al. 2001 **NORTH AMERICA** *United States*: LJ Brooks & Strohl 1992; SE Martin et al. 1997
No signif. difference						
Females larger						

1.3.4.15. Pituitary Gland, Size of

Among rats, two studies concluded that females have a larger pituitary gland than do males (Table 1.3.4.15).

Table 1.3.4.15. Pituitary gland, size of.

Nature of the Relationship							Multiple Age Categories
Larger in males							
No signif. difference							
Larger in females							**RODENT** *Rat*: Critchlow et al. 1963; Kitay 1963

1.3.4.16. Electric Organ

Some species of fish are capable of emitting electrical impulses that disable prey or stun conspecific rivals. Studies that have compared the sexes with respect to the emissions of these impulses have reached different conclusions, depending on the exact measure of emission used (Table 1.3.4.16).

Table 1.3.4.16. Electric organ.

Nature of the Relationship					Postpubertal	
						Adult
Males more						**FISH** *Electric Fish*: KD Dunlap et al 1997 (males longer pulse duration of electric organ discharge); KD Dunlap & Zakon 1998* (*Eigenmannia virescens*, pulse duration); KD Dunlap et al. 1998* (*Apteronotus albifrons*, electric organ discharge signals at lower frequencies); KD Dunlap et al. 1998* (*Apteronotus leptorhynchus*, number of chirps); KD Dunlap 2002 (*Apteronotus leptorhynchus*, chirps elicited by the presence of conspecifics); KD Dunlap 2002* (*Apteronotus leptorhynchus*, chirps at higher pitch measured as hertz frequency); KD Dunlap 2002* (*Apteronotus leptorhynchus*, number of chirps when a conspecific is present)
No signif. difference						**FISH** *Electric Fish*: KD Dunlap et al. 1998* (*Apteronotus albifrons*, number of electric organ discharge chirps)
Females more						**FISH** *Electric Fish*: CD Hopkins 1974 (*Sternopygus*, discharge frequency); KD Dunlap et al. 1997 (*Sternopygus*, discharge frequency); KD Dunlap & Zakon 1998* (*Eigenmannia virescens*, electric discharge hertz frequency)

1.4
BODILY SYSTEMS FUNCTIONING

Whereas in the preceding section, the focus was on structural aspects of the body, this section will concentrate on functional aspects of the body.

1.4.1. The Cardiovascular System

The cardiovascular system is comprised of the heart along with the arteries and veins that carry the blood throughout the body.

1.4.1.1. Blood Flow in General

The circulation of the blood throughout the cardiovascular system constitutes blood flow. Table 1.4.1.1 indicates that the blood flow of females surpasses that of males.

Table 1.4.1.1. Blood flow in general.

Nature of Any Difference					Postpubertal
					Adult
Higher in males					
No signif. difference					
Higher in females					**EUROPE** *Great Britain:* Centofanti et al. 2000 (pulsatile ocular blood flow) **MIDDLE EAST** *Israel*: Geyer et al. 2003 (pulsatile ocular blood flow) **NORTH AMERICA** *United States*: Gur et al. 1982 (in the cerebrum); Rodriguez et al. 1988 (in the cerebrum); Kastrup et al. 1999 (in the cerebrum);Gee et al. 2002 (pulsatile ocular blood flow)

1.4.1.2. Blood Pressure in General

The pressure of the blood exerted on the walls of the arteries during the action of contraction (systolic) and relaxation (diastolic) of the heart is known as *blood pressure*. Table 1.4.1.2 indicates that very inconsistent gender differences have been found. Ultimately, age and ethnic factors may account for some of the inconsistencies, as may the distinction between systolic and diastolic blood pressure. Also worth mentioning is that in no case are the sex differences very substantial; studies that have reported statistically significant differences have usually been based on large samples (i.e., over 1000).

Table 1.4.1.2. Blood pressure in general.

Nature of Any Difference					Postpubertal		Multiple Age Categories
					Adolescent	Adult	
Higher in males						**EUROPE** *Britain*: Annandale & Hunt 1990:35; Pickering 1991 (before age 45, ambulatory); Dunnell et al. 1999* **LATIN AMERICA** *Brazil*: Dressler et al. 1998b:437 **NORTH AMERICA** *United States*: Fillingim & Maixner 1996; Singha et al. 2000 (with cocaine usage); Wang et al. 2002:255 **RODENT** *Rat*: Dubey et al. 2002	**NORTH AMERICA** *United States*: Alvarez 1923:18-19; Fillingim & Maixner 1996; Reckelhoff 2001 **RODENT** *Rat*: Bayorh et al. 2001:249
No signif. difference						**AFRICA** *South Africa*: Kaminer & Lutz 1960 (!Kung tribe) **MIDDLE EAST** *Iran*: LB Page et al. 1978 (Qash'gai tribe) **NORTH AMERICA** *United States*: E Boyle 1970 (Blacks) **OCEANIA** *New Guinea*: Maddocks 1967 **RODENTS** *Gerbils*: ED Hall et al. 1991 (blood flow prior & post ischemia)	**LATIN AMERICA** *Columbia*: Oliver et al. 1975 (among the Yanomomo)
Higher in females					**NORTH AMERICA** *United States*: Sontag 1947	**EUROPE** *Britain*: Dunnell et al. 1999* (elderly) **NORTH AMERICA** *United States*: SV Stone et al. 1990 (young, video games & smoking) **OCEANIA** *Solomon Islands*: LB Page et al. 1974 (rises more in females with age)	**NORTH AMERICA** *Canada*: Walters et al. 2002:687

1.4.1.3. Blood Sugar: Within Individual Variations in

According to one study, females exhibit greater variation in blood sugar levels than do males (Table 1.4.1.3).

Table 1.4.1.3. Blood sugar: Within individual variations in.

Nature of Any Difference							Multiple Age Categories
Higher in males							
No signif. difference							
Higher in females							**NORTH AMERICA** *United States*: AW Rowe 1928

1.4.1.4. Blood Acidity: Within Individual Variability in

One study reported that females vary in their blood acidity to a greater degree than males (Table 1.4.1.4).

Table 1.4.1.4. Blood acidity: Within individual variability in.

Nature of Any Difference						Postpubertal
						Adult
Males more						
No signif. difference						
Females more						**NORTH AMERICA** *United States*: Shock & Hastings 1934

1.4.1.5. Blood Ejected From the Heart

One study found that during comparable degrees of exercise, males eject more blood from the heart than do females (Table 1.4.1.5).

Table 1.4.1.5. Blood ejected from the heart.

Nature of Any Difference						Postpubertal
						Adult
More in males						**NORTH AMERICA** *United States*: Higginbotham et al. 1984 (during exercise)
No signif. difference						
More in females						

1.4.1.6. Arterial Elastance (EaI)

Females have greater elasticity of the arterial walls than do males, according to two studies (Table 1.4.1.6).

Table 1.4.1.6. Arterial elastance (eai).

Nature of Any Difference						Postpubertal
						Adult
Greater in males						
No signif. difference						
Greater in females						**NORTH AMERICA** *United States*: Saba et al. 1999; Najjar et al. 2002

1.4.1.7. Arterial Size

A limited amount of research has concluded that the arteries of males are larger than those for females (Table 1.4.1.7.).

Table 1.4.1.7. Arterial size.

Nature of Any Difference						Postpubertal
						Adult
Greater in males						**NORTH AMERICA** *United States*: GT O'Connor et al. 1993 (left coronary arteries larger among patients); Sheifer et al. 2000 (left coronary arteries larger among patients & adjusted for body size)
No signif. difference						
Greater in females						

1.4.1.8. Diastolic Blood Pressure

The pressure of the blood exerted on the walls of the arteries during the relaxed phase of heart contraction is known as diastolic blood pressure. Table 1.4.1.8 indicates that inconsistent gender differences have been found in diastolic blood pressure, perhaps due to age and ethnic influences.

Table 1.4.1.8. Diastolic blood pressure.

Nature of Any Difference	Prepubertal				Postpubertal		Multiple Age Categories
				Childhood	Adolescent	Adult	
Higher in males						**EUROPE** *Britain*: O Evans & Steptoe 2003:765 (medical school students, at rest) **NORTH AMERICA** *United States*: Fillingim & Maixner 1996; Fichera & Andreassi 2000:269 (arterial) **OCEANIA** *New Guinea*: Sinnett & Whyte 1973	**EUROPE** *Germany*: Bottner et al. 2004:4054*(ages 8 to 18)
No signif. difference						**NORTH AMERICA** *United States*: Treiber et al. 2002:709 (young); Koertge et al. 2003:1320 (CAD patients); Aquilante et al. 2004:536 (varied results depending on dosage of dobutamine); Fillingim et al. 2005	
Higher in females				**ASIA** *Japan*: Kouda et al. 2003:1107* (older)	**ASIA** *Japan*: Kouda et al. 2003:1107*	**NORTH AMERICA** *United States*: E Boyle 1970 (Whites)	**EUROPE** *Wales*: Miall 1959

1.4.1.9. Systolic Blood Pressure

The pressure of the blood exerted on the walls of the arteries during the action of contraction is known as systolic blood pressure. Table 1.4.1.9 indicates that the nature of any gender differences in systolic blood pressure have not revealed a clear pattern. This conclusion conflicts somewhat with a meta-analysis by Stoney et al. (1987) which concluded that males have higher systolic blood pressure than do females.

Table 1.4.1.9. Systolic blood pressure.

Nature of Any Difference	Prepubertal				Postpubertal		Multiple Age Categories
				Childhood	Adolescent	Adult	
Higher in males					**ASIA** *Japan*: Kouda et al. 2003:1107* (young)	**EUROPE** *Britain*: O Evans & Steptoe 2003:765 (medical school students, at rest) **NORTH AMERICA** *United States*: Wingard et al. 1983:167 (White); Fichera & Andreassi 2000:269 (arterial); Treiber et al. 2002:709 (young)	**EUROPE** *Germany*: Bottner et al. 2004:4054*(ages 8 to 18)
No signif. difference						**NORTH AMERICA** *United States*: Koertge et al. 2003:1320 (CAD Patients) **OCEANIA** *New Guinea*: Sinnett & Whyte 1973	
Higher in females				**ASIA** *Japan*: Kouda et al. 2003:1107* (older)		**AFRICA** *South Africa*: Truswell et al. 1972 (with age, !Kung tribe) **NORTH AMERICA** *United States*: SR Barnett et al. 1999:1098; Aquilante et al. 2004:536 (when administered dobutamine)	

1.4.1.10. Pulse Rate

The rate at which the heart pulsates (rhythmical beats) per minute is known as pulse rate. One study found females exhibited higher pulse rates rather than men (Table 1.4.1.10).

Table 1.4.1.10. Pulse rate.

Nature of Any Difference							Multiple Age Categories
Higher in males							
No signif. difference							
Higher in females							**NORTH AMERICA** *United States*: Aronson & Burger 2000

1.4.1.11. Heart Rate in General

Sex differences in heart rates appear to vary by age, with most studies finding no differences in childhood. According to the studies reviewed in Table 1.4.1.11, following puberty, most studies have found females exhibiting higher heart rates than males under most testing conditions. This conclusion essentially concurs with a meta-analysis conducted by Stoney et al. (1987).

Table 1.4.1.11. Heart rate in general.

Nature of Any Difference	Prepubertal					Postpubertal	
	Fetal Stage	Infant	Toddler		Childhood	Adolescent	Adult
Males faster						**ASIA** *Russia*: Anishchenko et al. 2001	
No signif. difference	**NORTH AMERICA** *United States*: J Bernard 1964; Fleisher et al. 1997 (fetus); Genuis et al. 1996 (fetus)	**EUROPE** *Italy*: Stamba-Badiale et al. 1997; *Hungary*: Nagy et al. 2000 **NORTH AMERICA** *United States*: JM Richards et al. 1984*	**NORTH AMERICA** *United States*: JM Richards et al. 1984*		**NORTH AMERICA** *United States*: Frodi & Lamb 1978 (in response to crying babies); Rowland et al. 2000 (maximal heart rate; arterial venous oxygenation differences)		**EUROPE** *Britain*: Coventry & Hudson 2001:874 (baseline and while gambling) **NORTH AMERICA** *United States*: TG Power et al. 1982*: (heart rate acceleration in response to smiling infants) **OCEANIA** *Australia*: AS Jordan et al. 2004:997 (resting)
Females faster		**EUROPE** *Hungary*: Nagy et al. 2000 **NORTH AMERICA** *United States*: CW Townsend 1887			**NORTH AMERICA** *United States*: W Pearl 1996; MT Allen & Matthews 1997* (base line heart rate)	**NORTH AMERICA** *United States*: MT Allen & Matthews 1997* (base line heart rate); H Steiner et al. 2002 (base line heart rate)	**EUROPE** *Britain*: Eynde & Ostyn 1986 (after physical exercise); O Evans & Steptoe 2003:765 (medical school students) **NORTH AMERICA** *United States*: Bazett 1920 (resting heart rate, Winborn et al. 1988 (after physical exercise); SV Stone et al. 1990 (young, video games, & smoking); Koltyn et al. 1991 (after swimming); Sharpley 1994 (base line heart rate); PK Stein et al. 1997; SR Barnett et al. 1999:1198 (beats per minute); Fichera & Andreassi 2000:269; Pham & Rosen 2002 (higher resting heart rate); Koertge et al. 2003:1320 (CAD patients)

1.4.1.12. Increase in Heart Rate

A couple of studies have looked at heart rate increases in response to various stimuli but reached inconsistent conclusions (Table 1.4.1.12).

Table 1.4.1.12. Increase in heart rate.

Nature of Any Difference						Postpubertal
						Adult
Males greater						**NORTH AMERICA** *United States*: Cantor et al. 1978 (when viewing violent movie scenes)
No signif. difference						
Females greater						**NORTH AMERICA** *United States*: TG Power et al. 1982*: (heart rate acceleration in response to crying infants)

1.4.1.13. Heart Rate, Within Individual Variability in

Most studies have found males exhibiting greater variability in heart rates than is true for females (Table 1.4.1.13).

Table 1.4.1.13. Heart rate, within individual variability in.

Nature of Any Difference					Postpubertal	Multiple Age Categories
					Adult	
Males greater					**NORTH AMERICA** *United States*: Stein et al. 1997	**EUROPE** *Netherlands*: Ramaekers et al. 1998 **NORTH AMERICA** *United States*: MJ Cowan et al. 1994; Bigger et al. 1995; Umetani et al. 1998
No signif. difference						**NORTH AMERICA** *United States*: Aronson & Burger 2000
Females greater					**NORTH AMERICA** *United States*: SM Ryan et al. 1994 (in high-frequency heart rate subjects); Liao et al. 1995 (in high frequency heart-rate subjects); Huikuri et al. 1996 (in high frequency heart-rate subjects)	

1.4.1.14. Aggregation of Blood Platelets

Three studies of rodents have indicated that males have more aggregation of blood platelets than is true for females (Table 1.4.1.14).

Table 1.4.1.14. Aggregation of blood platelets.

Nature of Any Difference						Postpubertal
						Adult
Males greater						**RODENT** *Rat*: Emms & Lewis 1985; Morikawa et al. 1985; Kojima et al. 1993
No signif. difference						
Females greater						

1.4.1.15. QT Intervals

Heart beats can be monitored on an electrocardiogram (EKG) and described in terms of points when they shift in direction. These points are known as *Q* and *T*. Studies have sought to determine if the time intervals (described in milliseconds) differ according to gender. Table 1.4.1.15 indicates that the average interval is longer for females than for males.

Table 1.4.1.15. QT intervals.

Nature of Any Difference	Prepubertal				Postpubertal	
				Childhood	Adolescent	Adult
Males longer						
No signif. difference				**NORTH AMERICA** *Canada*: Rautaharju et al. 1992*; *United States*: Pearl 1996*		
Females longer				**NORTH AMERICA** *United States*: Makkar et al. 1993; JH Burke et al. 1997; Locati et al. 1998	**NORTH AMERICA** *United States*: Pearl 1996*	**EUROPE** *Italy*: Stramba-Badiale et al. 1997; *Netherlands*: Conrath et al. 2002 (patients with long QT syndrome) **NORTH AMERICA** *Canada*: Rautaharju et al. 1992*; *United States*: Merri et al. 1989; Hashiba 1992; Makkar et al. 1993; JH Burke et al. 1997; Lehmann et al. 1997

1.4.1.16. P-R Interval

The P-R interval refers to the time lapse between the beginning of a P-wave and the start of the QRS complex seen on an electrocardiogram. One study concluded that this interval on average is significantly greater for males than for females (Table 1.4.1.16).

Table 1.4.1.16. P-R interval.

Nature of Any Difference						Postpubertal
						Adult
Longer in males						**NORTH AMERICA** *United States*: SR Barnett et al. 1999:1098
No signif. difference						
Longer in females						

1.4.1.17. Ta-e Interval

The Ta-e interval is the length of time (in milliseconds) between the T spike of a heart beat and the end of the heart beat cycle. Studies suggest that, on average, this interval is slightly longer for males than for females (Table 1.4.1.17).

Table 1.4.1.17. Ta-e interval.

Nature of Any Difference	Prepubertal					
				Childhood		
Longer in males				**EUROPE** *Britain*: Smetana et al. 2003 **ASIA** *Japan*: Nakagawa et al. 2003; Nakagawa et al. 2004		
No signif. difference						
Longer in females						

1.4.1.18. Vagal Tone, Variations in

Vagal tone is associated with the cardiovascular system and the vagus nerve. As shown in Table 1.4.1.18, males have been shown to exhibit more distinct variations in vagal tone than females.

Table 1.4.1.18. Vagal tone, variations in.

Nature of Any Difference	Prepubertal					
				Childhood		
More in males				**ASIA** *Japan*: Nakagawa et al. 2003; Nakagawa et al. 2004 **EUROPE** *Britain*: Smetana et al. 2003 **NORTH AMERICA** *United States*: Elsenbruch et al. 1999 (greater decreased vagal tones of the heart rate while awake)		
No signif. difference						
More in females						

1.4.1.19. Vascular Constriction

Vascular constriction refers to the narrowing of the blood vessels. One study concluded that such constriction was greater in male than female rats following the consumption of salt (Table 1.4.1.19).

Table 1.4.1.19. Vascular constriction.

Nature of Any Difference					Postpubertal	
						Adult
Males more						**RODENT** *Rat*: LA Barron et al. 2002 (caused by sodium intake)
No signif. difference						
Females more						

1.4.1.20. Content of the Blood (Except Hormones)

A few studies have compared males and females with respect to the mineral, metal, and electrolyte content of the blood. As shown in Table 1.4.1.20, lead and potassium have been found to be higher in the blood of males, while cobalt, copper, calcium, and phosphate were higher in the blood of females.

Table 1.4.1.20. Content of the blood (except hormones).

Nature of Any Difference					Postpubertal	
					Adolescent	Adult
Higher in males					**EUROPE** *Sweden*: Barany et al. 2002* (lead) **NORTH AMERICA** *United States*: Wysowski et al. 2003* (serum potassium concentration)	**NORTH AMERICA** *United States*: Wysowski et al. 2003* (serum potassium concentration)
No signif. difference						
Higher in females					**EUROPE** *Sweden*: Barany et al. 2002* (cobalt, copper)	**ASIA** *China*: Yan et al. 2002 (elderly, osteocalcin, calcium and phosphate concentrations)

1.4.2. The Immune System

The immune systems of males and females are different, a conclusion that is inescapable when one considers the rates at which males and females contract various immune disorders (see Chapter 3). Here the results of a limited number of studies that have explored sex differences in the immune system are reviewed.

1.4.2.1. Immune (Antibody) Response in General

When the body is invaded by viruses or bacteria, one response of the immune system is to release atibodies that attempt to surround and kill the invaders. Table 1.4.2.1 indicates that this tendency is usually stronger for females than for males, both in humans and in rodents.

Table 1.4.2.1. Immune (antibody) response in general.

Nature of Any Difference						Postpubertal	Multiple Age Categories
						Adult	
Males stronger						**RODENT** *Meadow Vole*: S L Klein et al. 1997* (when pair housed)	
No significant difference						**RODENT** *Meadow Vole*: S L Klein et al. 1997* (when pair housed)	
Females stronger						**RODENT** *Mouse*: Y Weinstein et al. 1984 (thymocyte & lymphocyte responses to antigens); *Rat*: Grossman 1985; Grossman & Roselle 1986**;** *Prairie Vole*: S L Klein et al. 1997* (when pair housed)	**NORTH AMERICA** *United States*: Rhodes et al. 1969 (brucella); Michaels & Rogers 1971 (E coli); Patty et al. 1976 (measles); London & Drew 1977 (hepatitis); MJ Spencer et al. 1977 (rubella)

1.4.2.2. Allograft Rejection

An allograft refers to tissue transplanted from one individual to another (assuming they are members of the same species). One study concluded that allographs are more often rejected by the bodies of females than by those of males (Table 1.4.2.2).

Table 1.4.2.2. Allograft rejection.

Nature of Any Difference						Postpubertal	
						Adult	
Males more							
No significant difference							
Females more						**NORTH AMERICA** *United States*: Graff et al. 1969	

1.4.2.3. Immunoglobulin-M (IgM) Level

The secretion of Immunoglobulin-M (IgM) is the immune system's first response to microbial invasion, and thus plays a critical role in maintaining health. Females have been shown to have higher levels of IgM than do males (Table 1.4.2.3).

Table 1.4.2.3. Immunoglobulin-M (igm) level.

Nature of Any Difference				Prepubertal			Multiple Age Categories
				Childhood			
Male levels higher							
No signif. difference							
Female levels higher				**EUROPE** *Britain*: Butterworth et al. 1967			**NORTH AMERICA** *United States*: K Rhodes et al. 1969

1.4.2.4. Immunoglobulin-E (IgE) Response to Foreign Microbial Invasion

Immunoglobulin-E (IgE), like IgM, is important in warding off microbial invaders. One study of rats indicates that females exhibited a stronger IgE response to invading bacteria than did males (Table 1.4.2.4).

Table 1.4.2.4. Immunoglobulin-E (ige) response to foreign microbial invasion.

Nature of Any Difference						Multiple Age Categories
Stronger in males						
No signif. difference						
Stronger in females						**RODENT** *Rat*: Astoquiza et al. 1991

1.4.2.5. Immunological Responsiveness to GnRH

One study of immune system responses to GnRH (gonadotropin-releasing hormone) among rats concluded that this hormone was stronger among females than among males (Table 1.4.2.5).

Table 1.4.2.5. Immunological responsiveness to GnRH.

Nature of Any Difference						Postpubertal	
						Adult	
Stronger in males							
No signif. difference							
Stronger in females						**RODENT** *Rat*: TL Morton et al. 2003	

1.4.2.6. Islet Cell Autoantibodies

Islet cell autoantibodies (ICAs) are important in health maintanance, especially with regarding resistance to Type 1 diabetes. According to the one located study, males have greater ICAs than do females (Table 1.4.2.6).

Table 1.4.2.6. Islet cell autoantibodies.

Nature of Any Difference						Postpubertal
						Adult
Males have more						**EUROPE** *Finland*: Krischer et al. 2004 (ICAs)
No signif. difference						
Females have more						

1.4.2.7. Serum Bilirubin Levels

Serum bilirubin levels appear to protect against colorectal cancer. Two studies concluded that levels of serum bilirubin are higher among males than among females (Table 1.4.2.7).

Table 1.4.2.7. Serum bilirubin levels.

Nature of Any Difference						Postpubertal
						Adult
Male levels higher						**NORTH AMERICA** *United States*: Manolio et al. 1992; SD Zucker et al. 2004
No signif. difference						
Female levels higher						

1.4.2.8. T-Cell Ratio

T-cells are any of several lymphocytes that form in the thymus and have the ability to recognize specific peptide antigens, or the proteins of micorscopic invaders. According to one study, females have higher T-cell ratios or exhibit stronger T-cell response to antigens than do males (Table 1.4.2.8).

Table 1.4.2.8. T-cell ratio.

Nature of Any Difference						Postpubertal
						Adult
Males levels higher						
No signif. difference						
Females levels higher						**EUROPE** *Italy*: Amadori et al. 1995 (CD4/CD8 T-cell ratio)

1.4.2.9. T-Cell Reactivity

T-cells are any of several lymphocytes that form in the thymus and have the ability to recognize specific peptide antigens. According to one study, females have higher T-cell reactivity to immunodominant PLP peptides than do males (Table 1.4.2.9).

Table 1.4.2.9. T-cell reactivity.

Nature of Any Difference						Postpubertal
						Adult
Males levels higher						
No signif. difference						
Females levels higher						**OCEANIA** *Australia*: Greer et al. 2004

1.5

BASIC BODILY FUNCTIONING

Bodily functioning covers a broad range of internal processes that are constantly changing throughout the lives of organisms.

1.5.1. Metabolic Process

Metabolic processes have to do with how quickly foods and other substances are absorbed and utilized by the body.

1.5.1.1. Protein Intake

One study of rats indicates that males consumed higher proportions of their diet in the form of protein than was the case for females (Table 1.5.1.1).

Table 1.5.1.1. Protein intake.

Nature of the Relationship	Postpubertal
	Adult
Males consume more	**RODENT** *Rat*: Leshner & Collier 1973 (young, protein to non-protein consumption ratio)
No signif. difference	
Females consume more	

1.5.1.2. Gastric Emptying/Rate of Bowel Movements

The speed with which unabsorbed portions of consumed food pass through the intestines and are expelled from the body is known as the rate of *gastric emptying*. In recent years, the measurement of gastric emptying has largely relied on asking subjects to consume a radioactive substance that is later detected in the urine and feces (Sadik et al. 2003:37). A closely related concept is termed *colonic transit speed* (Meier et al. 1995). As shown in Table 1.5.1.2, most studies have found that males expel solid waste at a higher average rate than is true for females while there are no significant differences in the expulsion of liquid waste by the small intestine.

Table 1.5.1.2. Gastric emptying/rate of bowel movements.

Nature of the Relationship	Postpubertal	Multiple Age Categories
	Adult	
Males more rapid	**ASIA** *Singapore*: LY Chen et al. 2000 (more frequent bowel movements) **EUROPE** *Sweden*: Hermansson & Sivertsson 1996 (large intestines) **NORTH AMERICA** *United States*: AM Metcalf et al. 1987 (colonic transit); Abrahamsson et al. 1988 (colonic transit); R Meier et al. 1995 (colonic transit);J Hamilton & Yonkers 1996 (females more reduced rate); Tougas et al. 2000 (large intestines); Teff et al. 1999 (liquids and solids)	**EUROPE** *Sweden*: Stotzer et al. 1999 (large intestines); Sadik et al. 2003 (large & small intestines)
No signif. difference	**EUROPE** *Netherlands*: Bennink et al. 1999 (small intestines) **NORTH AMERICA** *United States*: Madsen 1992 (small intestines); Argenyi et al. 1995 (small intestines)	
Females more rapid		

1.5.1.3. Gastric Acidity

According to two studies, females have greater acidity in the stomach than do males (Table 1.5.1.3).

Table 1.5.1.3. Gastric acidity.

Nature of the Relationship	Postpubertal
	Adult
Males more	
No signif. difference	
Females more	**NORTH AMERICA** *United States*: M Grossman et al. 1963; J Hamilton & Yonkers 1996

1.5.1.4. Circadian Rhythm/Phase

No consistent conclusion has been reached regarding any gender differences in circadian rhythms or phases (Table 1.5.1.4).

Table 1.5.1.4. Circadian rhythm/phase.

Nature of Any Difference	Postpubertal
	Adult
Males shift more	**NORTH AMERICA** *United States*: KE Moe et al. 1991 (elderly)
No signif. difference	**NORTH AMERICA** *United States*: PP Shelton et al. 2002
Females shift more	

1.5.1.5. Intestinal Transit Time

One study concluded that waste material passes through the small intestines quicker in females than in males (Table 1.5.1.5).

Table 1.5.1.5. Intestinal transit time.

Nature of Any Difference	Postpubertal
	Adult
Males shift more	
No signif. difference	
Females shift more	**NORTH AMERICA** *United States*: Rao et al. 1987 (small intestine transit time)

1.5.1.6. Body Temperature: Within Individual Variation in

Two studies concluded that females exhibit greater intra-individual variation in body temperature than do males (Table 1.5.1.6).

Table 1.5.1.6. Body temperature: Within individual variation in.

Nature of Any Difference	Multiple Age Categories
Males more	
No signif. difference	
Females more	**NORTH AMERICA** *United States*: AC Burton 1939; Murlin 1939

1.5.2 Oxidative Processes

Oxidation describes the loss of electrons by a molecule, atom or ion and is one of the basic metabolic processes of the body.

1.5.2.1. Oxygen Intake

Two studies were located pertaining to gender differences in oxygen intake under comparable testing conditions. One study found the intake to be greater in males and the other reported no significant gender difference (Table 1.5.2.1).

Table 1.5.2.1. Oxygen intake.

Nature of Any Difference	Prepubertal	Postpubertal
	Childhood	Adolescent
Intake higher in males	**NORTH AMERICA** *United States*: N Armstrong et al. 1995*	
No signif. difference		**ASIA** *China*: AM McManus et al. 2004 (young)
Intake higher in females		

1.5.2.2. Oxidizing Fatty Acids

As shown in Table 1.5.2.2, one study reported that females oxidize fatty acids at higher rates than do males.

Table 1.5.2.2. Oxidizing fatty acids.

Nature of Any Difference					Postpubertal	
						Adult
More in males						
No signif. difference						
More in females						**EUROPE** *Denmark*: Roepstorff et al. 2002:E445 (long-chain fatty acids)

1.5.2.3. Protein Oxidation

Protein oxidation refers to the biochemical process of altering protein molecules. As shown in Table 1.5.2.3, this process has been found to occur more rapidly in males than in females.

Table 1.5.2.3. Protein oxidation.

Nature of Any Difference					Postpubertal	
						Adult
Males more						**NORTH AMERICA** *United States*: SM Phillips et al. 1993 (during exercise); Tarnopolsky et al. 1995 (during exercise); Tarnopolsky et al. 1997; Lamont et al. 2001
No signif. difference						
Females more						

1.5.2.4. Golgi Apparatus, Size of

The golgi apparatus (or golgi body) is important in relaying chemical signals within the cells. Comparisons of golgi apparatuses within certain brain cells brought one study to conclude that these structures were larger in males than in females. However, another study failed to find a significant gender difference (Table 1.5.2.4.).

Table 1.5.2.4. Golgi apparatus, size of

Nature of Any Difference					Postpubertal	
						Adult
More in males						**EUROPE** *Netherlands*: Ishunina et al. 1999 (size of golgi apparatus in vasopressin neurons in the dorsolateral supraoptic nucleus of young adults)
No signif. difference						**EUROPE** *Netherlands*: Ishunina et al. 2002 (size of golgi apparatus in vasopressin neurons in the supraoptic nucleus)
More in females						

Chapter 2

THE BRAIN AND BIOCHEMISTRY

This chapter summarizes research findings on gender differences in brain structures and functioning as well as in all aspects of biochemistry. Because the biochemistry of the brain and the body are exceedingly complex and dynamic, many of the topics covered in this chapter are highly detailed and technical. Another reason for the technical nature of this chapter involves the fact that males and females of most species differ in body size. Some studies adjust for body size when comparing different aspects of the brain, or different amounts of various biochemicals, while others do not. Also, sometimes biochemical sex differences will be found in one part of the body but not in others. These nuances are noted when relevant.

2.1

THE NERVOUS SYSTEM

The central nervous system (CNS) consists of the brain and spinal cord. The peripheral nervous system (PNS) involves all nerve processes found outside the CNS. The CNS and PNS essentially guide and coordinate nearly all of the functioning of the rest of the body.

2.1.1. General Physical Brain Characteristics

Research findings regarding basic physical characteristics of the brain are reviewed below. They pertain to the overall size of the brain as well as the composition of various subcomponents.

2.1.1.1. Head Circumference and Cranial Capacity

Simply measuring the circumference of the head provides a crude measure of brain size and has been used for this purpose for many years. This crude method of measuring cranial capacity involved filling an empty skull with sand small pellets and assessing the cubic centimeters displaced by this material in a measuring beaker. As shown in Table 2.1.1.1, studies have revealed that for all age groups, males have larger head circumferences and cranial capacities than do females. None of these studies adjusted for sex differences in body weight.

Table 2.1.1.1. Head circumference and cranial capacity.

Nature of Any Difference	Prepubertal				Postpubertal	
	Infant	Toddler	Early Childhood	Childhood	Adolescent	Adult
Larger in males	**NORTH AMERICA** *United States*: LE Holt 1897 (neonate); DB Gardner & Swiger 1958 (neonate, adoptees); Alomli et al. 2001:256 (neonate)	**NORTH AMERICA** *United States*: LE Holt 1897; Eichorn & Bailey 1962*	**NORTH AMERICA** *United States*: Eichorn & Bailey 1962*; Rocha & Malina 1983:466*	**NORTH AMERICA** *United States*: Eichorn & Bailey 1962*; Rocha & Malina 1983:466*	**NORTH AMERICA** *United States*: Eichorn & Bailey 1962*; Rocha & Malina 1983:466*	**NORTH AMERICA** *United States*: Eichorn & Bailey 1962*; DeCarli et al. 2005 (cranial capacity)
No signif. difference						
Larger in females						

2.1.1.2. Brain Size/Brain Weight/Brain Volume

According to Table 2.1.1.2, human males have larger brains than do females. This conclusion is consistent with generalizations reached by Swaab and Hoffman (1984) and by Lynn (1999), while it is inconsistent with Halpern's (1992:140) assertion that no significant sex difference in brain size has been documented. Some of the studies cited in Table 2.1.1.2 made adjustments for body size. Doing so reduced the brain size difference by about half, but male brains were still significantly larger. So far, only three studies have involved species other than humans. The one involving rhesus monkeys found male brains larger, while the two studies of rodents found no significant sex difference.

Table 2.1.1.2. Brain size/brain weight/brain volume.

Nature of Any Difference	Prepubertal				Postpubertal		Multiple Age Categories
	Infant		Early Childhood	Childhood	Adolescent	Adult	
Larger in males	**EUROPE** *Germany*: Waldeyer 1908 **NORTH AMERICA** *United States*: Janowsky 1989		**EUROPE** *Netherlands*: Swaab & Hofman 1984* (adjusted for body weight)	**NORTH AMERICA** *United States*: Burt & Moore 1912; Giedd et al. 1996*; Castellanos et al. 2002:1746* (unadjusted for body size)*	**NORTH AMERICA** *United States*: Burt & Moore 1912; Giedd et al. 1996*; Castellanos et al. 2002:1746* (unadjusted for body size)*	**EUROPE** *Netherlands*: Swaab & Hofman 1984* (adjusted for body weight) **NORTH AMERICA** *Canada*: Ankey 1992 (adjusted for body size); *United States*: Dekaban & Sadowsky 1978 (throughout adult life); Kretschmann et al. 1979 (height controlled); Zetz et al. 1982; Rushton 1992 (adjusted for body size); SM Breedlove 1994 (adjusted for height differences); Cowell et al. 1994; Filipek et al. 1994 (young); Schlaepfer et al. 1995 (brain volume); M Peters et al. 1998; Nopoulos et al. 2000 (young); JS Allen et al. 2002; Byne et al. 2001 (brain weight); DeCarli et al. 2005 **PRIMATE (EXCEPT APE)** *Rhesus Macaques*: D Folk et al. 1999	**EUROPE** *Denmark*: Holloway 1980 (throughout life); *Estonia*: Lynn et al. 2000 (7-18 year olds) **NORTH AMERICA** *United States*: Mall 1909; Dekaban & Sadowski 1978; Ho et al. 1980; R Lynn 1993 (adjusted for body size); Filipek et al. 1994 (whole brain volume); Pfefferbaum et al. 1994; Blatter et al. 1995; Flaum et al. 1995 (among schizophrenics); Nopoulos et al. 2000; Rushton et al. 2000
No signif. difference						**NORTH AMERICA** *United States*: Ho et al. 1980 (adjusted for body size) **RODENT** *Mouse*: Koshibu et al. 2004 (C57Bl/6J strain, 3-D MRI); *Rat*: Madeira et al. 1991 (Sprague-Dawley rats)	
Larger in females				**NORTH AMERICA** *United States*: A Reiss et al. 2004 (among children born prematurely)			

2.1.1.3. Brain Growth Rate

One study of rats concluded that male brains grow at a faster rate than female brains during the latter portion of gestation and into the first few days following birth (Table 2.1.1.3).

Table 2.1.1.3. Brain growth rate.

Nature of Any Difference	Citation
More rapid in males	**RODENT** *Rat*: Ryzhavskii & Biriukova 1993 (embryonic day 21 through postnatal day 5, brain mass)
No signif. difference	
More rapid in females	

2.1.1.4. Size of the Brain Ventricles

Ventricles are the fluid-filled cavities within the brain. Findings have been mixed with respect to any sex differences in the volume of these ventricles, although most studies of humans suggest that males have somewhat larger ventricles (Table 2.1.1.4).

Table 2.1.1.4. Size of brain ventricles.

Nature of Any Difference	Prepubertal	Postpubertal	
	Childhood	Adolescent	Adult
Larger in males	**NORTH AMERICA** *United States*: Reiss et al. 1996 (total volume); Eliez et al. 2001 (3rd ventricle, persons with fragile X syndrome)	**MIDDLE EAST** *Turkey*: Celik et al. 1995* (3rd ventricle, CT scan) **NORTH AMERICA** *United States*: Giedd et al. 1996 (total volume)	**MIDDLE EAST** *Turkey*: Celik et al. 1995* (3rd ventricle, CT scan) **NORTH AMERICA** *United States*: DeCarli et al. 2005 (lateral ventricle and temporal horn of lateral ventricles)
No signif. difference		**MIDDLE EAST** *Turkey* Celik et al. 1995* (lateral ventricles, CT scan)	**MIDDLE EAST** *Turkey*: Celik et al. 1995* (lateral ventricles, CT scan) **RODENT** *Mouse*: Koshibu et al. 2004* (3rd ventricle, 3-D MRI, C57Bl/6J strain)
Larger in females			**RODENT** *Mouse*: Koshibu et al. 2004* (lateral ventricles, 3-D MRI, C57Bl/6J strain)

2.1.1.5. Ratio of Gray-to-White Matter

White matter consists of neuronal axons with a fatty or white nerve covering called myelin that speeds up the passage of signals. Gray matter is composed of neuronal axons without myelin. Except for a couple of studies reporting no significant sex differences, research has repeatedly shown that the ratio of gray-to-white matter is higher in males than in females (Table 2.1.1.5).

Table 2.1.1.5. Ratio of gray-to-white matter.

Nature of Any Difference	Prepubertal	Postpubertal	
	Childhood	Adolescent	Adult
Males higher		**EUROPE** *Switzerland*: Rabinowicz et al. 2002	**NORTH AMERICA** *Canada:* Witelson 1989; *United States*: LS Allen & Gorski 1987; Filipek et al. 1994 (young); Schlaepfer et al. 1995 (in the prefrontal cortex and superior-temporal gyrus); Passe et al. 1997; M Peters et al. 1998; Gur et al. 1999 (young); Highley et al. 1999; Nopoulos et al. 2000; JM Goldstein et al. 2001; JS Allen et al. 2003 (in the cerebrum); RJ Haier et al. 2005
No signif. difference	**NORTH AMERICA** *United States*: AL Reiss et al. 1996		**NORTH AMERICA** *United States*: Schlaepfer et al. 1995 (young, in the parietal lobe)
Females higher			

2.1.1.6. Volume of White Matter in the Brain

Two studies have concluded that males have more white matter in the brain than do females (Table 2.1.1.6).

Table 2.1.1.6. Volume of white matter in the brain.

Nature of Any Difference	Postpubertal
	Adult
Males higher	**NORTH AMERICA** *United States*: Filepek et al. 1994 (in the neocortex); Gur et al. 1999
No signif. difference	
Females higher	

2.1.1.7. Myelination

According to one study of rats, females exhibited greater myelination of axons in the corpus callosum following environmental enrichment experiences than did males (Table 2.1.1.7). In the genu region of the corpus callosum, females had more unmyelinated axons, but fewer myelinated axons than males.

Table 2.1.1.7. Myelination.

Nature of Any Difference	Prepubertal	Postpubertal
	Infant	Adult
Males		**RODENT** *Rat*: Mack et al. 1995* (genu region in Purdue-Wistar rats; number of myelinated axons)
No signif. difference	**MARSUPIAL** *Gray Opossum*: LeBlond & Cabana 1997 (birth to 7 weeks of age, C8 & L4 roots of the spinal cord)	**RODENT** *Rat*: Juraska & Kopcik 1988* (of axons in the posterior corpus callosum, reared in a deprived environment)
Females		**RODENT** *Rat*: Juraska & Kopcik 1988* (of axons in the posterior corpus callosum, reared in a complex environment); Mack et al. 1995* (number of unmyelinated axons and ratio of myelinated to unmyelinated axons in the genu region of the corpus callosum of Purdue-Wistar rats)

2.1.2. Neocortical Size (Except When Lateralized)

The neocortex is the primary portion of the human brain that is most highly developed in humans. In other words, when comparing the human brain to that of, say, the chimpanzee, the size and shape of the structures are nearly identical except in the case of the neocortex. The human neocortex is nearly four-times greater than that of chimpanzees.

2.1.2.1. Neocortex (Cerebrum) in General, Size of

Most studies, at least among humans, have indicated that the neocortex is larger among males than among females. However, the one study that adjusted for the fact that male brains as a whole are larger concluded that proportionally the size of the male neocortex and that of the female are equivalent (Table 2.1.2.1).

Table 2.1.2.1. Neocortex (cerebrum) in general, size of.

Nature of Any Difference	Prepubertal		Postpubertal	Multiple Age Categories
	Infant	Childhood	Adult	
Greater in males	**RODENT** *Rat*: Ryzhavskii & Birivkova 1993 (postnatal day 5, thickness)	**NORTH AMERICA** *United States*: JN Giedd et al. 1997 (volume); Rabinowicz et al. 1999	**NORTH AMERICA** *Canada*: Witelson et al. 1995; *United States*: Filipek et al. 1994*; Passe et al. 1997; Nopoulos et al. 2000; Goldstein et al. 2001; Allen et al. 2002 **RODENT** *Mouse*: Markham et al. 2003 (thicker in the limb control area, the somatosensory area, & the posterior parietal area); *Rat*: SN Reid & Juraska 1992 (longer & wider)	**NORTH AMERICA** *United States*: MC Diamond et al. 1979; Henery & Mayhew 1989; Cowell et al. 1994; Pakkenberg & Gundersen 1997; Raz et al. 1998
No signif. difference			**NORTH AMERICA** *United States*: Filipek et al. 1994:352* (relative to the brain size as a whole)	
Greater in females				**RODENT** *Rat*: Juraska 1990 (thickness)

2.1.2.2. Frontal Lobes, Size of

The frontal lobes are a prominent part of the neocortex, comprising nearly a third of its total volume. These lobes play an important part in the intellectual tasks requiring long-term planning, impulse control, and even moral reasoning.

2.1.2.2a. Frontal Lobes, Overall Size of

As shown in Table 2.1.2.2, most studies have concluded that males have slightly but significantly larger frontal lobes than do females. It should be pointed out, however, that males have larger brains as a whole (and larger bodies as well). If controls were introduced for these latter findings, most if not all of the sex difference in frontal lobe size may be eliminated.

Table 2.1.2.2. Frontal lobes, overall size of.

Nature of Any Difference	Postpubertal
	Adult
Larger in males	**NORTH AMERICA** *United States*: Nopoulos et al. 2000; JM Goldstein et al. 2001; JS Allen et al. 2002; DeCarli et al. 2005
No signif. difference	**NORTH AMERICA** *United States*: Cowell et al. 1994
Larger in females	

2.1.2.2b. Frontal Lobes, Size of Subcomponents

According to one study, the size of the orbital frontal cortex, a subcomponent of the frontal lobes, is larger in women than in men (Table 2.1.2.2b). However, not all subcomponents of the frontal cortex show sex differences.

Table 2.1.2.2b. Frontal lobes, size of subcomponents.

Nature of Any Difference	Postpubertal
	Adult
Larger in males	
No signif. difference	**NORTH AMERICA** *United States*: Bryant et al. 1999 (prefrontal cortex); Gur et al. 2002* (dorsal prefrontal cortex)
Larger in females	**NORTH AMERICA** *United States*: Gur et al. 2002* (orbital frontal cortex)

2.1.2.3. Parietal Lobe, Size of

The parietal lobes are part of each hemisphere and are located between the frontal lobes and the occipital lobes. Functionally, the parietal lobes appear to be primarily involved in interpreting sensory information having to do with touch and physical pain. However, these lobes also seem to play an important role in eye-hand coordination. Two studies have indicated that a lower portion of the left parietal lobe in males is larger than is the case for females after adjusting for sex differences in overall brain size, while one study failed to document a statistically significant difference (Table 2.1.2.3).

Table 2.1.2.3. Parietal lobe, size of.

Nature of Any Difference	Postpubertal	Multiple Age Categories
	Adult	
Males larger on the left		**NORTH AMERICA** *United States*: DN Kennedy et al. 1998 (inferior portion); Frederikse et al. 1999 (inferior portion)
No signif. difference	**NORTH AMERICA** *United States*: DeCarli et al. 2005	
Females larger on the left		

2.1.2.4. Postcentral Sulcus Extension Into the Sylvian Fissure, Length of

The postcentral sulcus extension into the Sylvian fissure is a part of the parietal lobes. Two studies indicate that this extension is longer in the brains of males relative to those of females (Table 2.1.2.3).

Table 2.1.2.4. Postcentral sulcus extension into the Sylvian fissure, length of.

Nature Any Difference	Multiple Age Categories
More continuous in males	**LATIN AMERICA** *Chile*: Ide et al. 1996 (in the left hemisphere); Ide & Aboitiz 2001 (in the left hemisphere)
No signif. Difference	
More continuous in females	

2.1.2.5. Occipital Lobe, Size of

The occipital lobes are located at the back of the brain and are involved in vision. The single study cited shows no overall sex difference in the size of the occipital lobes (Table 2.1.2.5.).

Table 2.1.2.5. Occipital lobe, size of.

Nature of Any Difference					Postpubertal
					Adult
Males					
No signif. difference					**NORTH AMERICA** *United States*: DeCarli et al. 2005
Females					

2.1.2.6. Visual Cortex, Size of

The visual cortex is the outermost layer of cells in the occipital lobe and is involved in processing visual information. Among rats, one study found males with a larger subportion of the visual cortex but no difference in another subportion. In humans, one study indicated that females had a larger subsection (Table 2.1.2.6).

Table 2.1.2.6. Visual cortex, size of.

Nature Any Difference			Prepubertal			Postpubertal
			Early Childhood			Adult
Males larger			**RODENT** *Rat*: Seymoure & Juraska 1992* (at weaning, thickness in layer II-IV of the binocular subfield)			**RODENT** *Rat*: Reid & Juraska 1992 (more neurons in the binocular areas); Reid & Juraska 1995 (more neurons in the binocular areas)
No signif. difference			**RODENT** *Rat*: Seymoure & Juraska 1992* (at weaning, thickness of the monocular subfield)			
Females larger						**NORTH AMERICA** *United States*: Pietrini et al. 2000:1778 (young, in the binocular areas)

2.1.3. Size Differences in the Hemispheres and Connective Tissue

The neocortex is clearly identifiable as having left and right halves, called *hemispheres*. These hemispheres generally control the opposite side of the body, a phenomenon known as contralateral control. As shown in the tables below, various aspects of the two hemispheres have been examined with respect to sex differences.

2.1.3.1. Relative Size of the Hemispheres (Physical Brain Asymmetry)

Numerous studies have compared the two hemispheres in terms of their relative size. As shown in Table 2.1.3.1, nearly all of these investigations have concluded that, among humans, males have a greater disparity in the size of their hemispheres than do females. The most common difference has been that males have a larger right than left hemisphere, whereas in females the hemispheres are more evenly proportioned in overall size. In the case of rodents, the nature of any gender difference appears to be difficult to characterize and may depend on specific regions of the neocortex.

Table 2.1.3.1. Relative size of the hemispheres (physical brain asymmetry).

Nature of Any Difference					Postpubertal	Multiple Age Categories
					Adult	
Greater/ larger in males					**NORTH AMERICA** *United States*: Bear et al. 1986; Kulynych et al. 1994; Reite et al. 1995; Gur et al. 2000 **RODENT** *Rat*: MC Diamond 1987 (in the occipital region)	**NORTH AMERICA** *United States*: Wade 1975; Ray et al. 1976; Trotman & Hammond 1979; A Glass et al. 1984; Rippon 1990; Shaywitz et al. 1995; Kansaku et al. 2000
No signif. difference					**EUROPE** *France*: Robichon et al. 1999 (neuroimaging of the planum temporate area)	
Greater/ larger in females						

2.1.3.2. Right Hemisphere, Size of

As shown in Table 2.1.3.2, studies have reached somewhat conflicting results regarding the possibility of a sex difference in the size of the right hemisphere of the neocortex, although most studies of humans and rodents suggest that it is larger in males than in females.

Table 2.1.3.2. Right hemisphere, size of.

Nature of Any Difference	Prepubertal		Postpubertal	Multiple Age Categories
	Infant	Childhood	Adult	
Greater/ larger in males	**NORTH AMERICA** *United States*: Shucard et al. 1984 (neonate); de Lacoste et al. 1991 (fetal development); Gratton et al. 1992 (neonate)	**RODENT** *Rat*: MC Diamond et al. 1981 (larger right than left)	**RODENT** *Rat*: MC Diamond et al. 1981 (larger right than left in areas 17 & 39); MC Diamond 1988:21 (larger right than left)	**NORTH AMERICA** *United States*: MC Diamond et al. 1981; G Murphy 1984 **OCEANIA** *Australia:* Yucel et al. 2001
No signif. difference				
Greater/ larger in females	**RODENT** *Rat*: Tobet et al. 1993 (postnatal day 20, barrel cortex)		**NORTH AMERICA** *United States*: Rademacher 2001 (postmortem)	

2.1.3.3. Left Hemisphere, Size of

One study of rats reached the conclusion that the left hemisphere of males was larger than was that of females (Table 2.1.3.3).

Table 2.1.3.3. Left hemisphere, size of.

Nature of Any Difference	Prepubertal
	Infant
Greater/larger in males	**RODENT** *Rat*: Tobet et al. 1993 (postnatal day 20, barrel cortex)
No signif. Difference	
Greater/larger in females	

2.1.3.4. Corpus Callosum, Size of

The corpus callosum is the tissue of the brain connecting the two hemispheres, with portions also connecting the neocortex as a whole to subcortical regions of the brain. Considerable research has investigated possible gender differences in the size of the corpus callosum and its various subdivisions. As shown in Table 2.1.3.4, in humans, most but not all studies have found the corpus callosum to be larger in females than in males. Findings for other species have been mixed.

Table 2.1.3.4. Corpus callosum, size of.

Nature of Any Difference	Prepubertal	Postpubertal	Multiple Age Categories
	Infant	Adult	
Larger in males	**RODENT** *Rat*: Zimmerberg & Scalzi 1989* (postnatal day 3, overall size)	**EUROPE** *Germany*: R Westerhausen et al. 2004 (overall volume) **RODENT** *Rat*: Berrebi et al. 1988 (overall corpus callosum); Zimmerberg & Mickus 1990* (overall corpus callosum); Ojima et al. 1996 (midsagital area)	
No signif. difference	**RODENT** *Rat*: Zimmerberg & Scalzi 1989* (postnatal day 3, midline sagital areas of the anterior commissure)	**NORTH AMERICA** *United States*: RM Bishop & Wahlsten 1997 (posterior portion) **RODENT** *Mouse*: Zimmerberg & Mickus 1990* (midline sagital area of the anterior commissure); Ojima et al. 1996 (anterior commissure); Manhaes et al. 2002 (length, BALB/cCF strain); *Rat*: Mack et al. 1995* (genu region in Purdue-Wistar rats; diameter of axon)	**NORTH AMERICA** *United States*: Demeter et al. 1988 (anterior commissure); Highley et al. 1999 (anterior commissure); Lasco et al. 2002 (anterior commissure)
Larger in females		**NORTH AMERICA** *Canada*: Witelson 1989 (college, overall size); N Driesen & Raz 1995 (overall size); *United States*: De Lacoste-Utamsing & Holloway 1982 (posterior portion); LS Allen & Gorski 1991 (anterior commissure) **RODENT** *Rat*: Mack et al. 1995* (genu region in Purdue-Wistar rats; diameter of axon)	**NORTH AMERICA** *United States*: DeLacoste-Utamsing & Holloway 1982 (bulbous splenium); S Clark et al. 1989; LS Allen & Gorski 1992 (anterior commissure); M Hines et al. 1992; Steinmatz et al. 1992; JM Clarke & Zaidel 1994; Shaywitz et al. 1995; Salat et al. 1997 (bulbous spelenum); Davatzikos & Resnick 1998 (bulbous splenium)

2.1.3.5. Temporal Lobe, Size of

The temporal lobes are part of each hemisphere, located on each side of the brain between the frontal lobes and the occipital lobes. It is unclear the extent to which the size of the temporal lobes is sexually dimorphic (Table 2.1.3.5).

Table 2.1.3.5. Temporal lobe, size of.

Nature of Any Difference					Postpubertal		
						Adult	
Larger in males						**NORTH AMERICA** *United States*: Bryant et al. 1999	
No signif. difference						**NORTH AMERICA** *United States*: DeCarli et al. 2005	
Larger in females							

2.1.3.6. Broca's Area, Size of

On the left frontal lobe is a region of the brain that is instrumental in the production of speech for the vast majority of humans. The two studies that compared the sexes with respect to the size of this region, called Broca's area, concluded that it is significantly larger in females than in males (Table 2.1.3.6).

Table 2.1.3.6. Broca's area, size of.

Nature of Any Difference							Multiple Age Categories
Larger in males							
No signif. Difference							
Larger in females							**EUROPE** *France*: Robichon et al. 1999 (neuroimaging) **NORTH AMERICA** *United States*: Harasy et al. 1997

2.1.3.7. Wernicke's Area, Size of

Wernicke's area is located in the posterior portion of the neocortex's left hemisphere. In nearly all humans, it serves to interpret linguistic communication. One study concluded that Wernicke's area is larger on average in females than in males (Table 2.1.3.7).

Table 2.1.3.7. Wernicke's area, size of.

Nature of Any Difference							Multiple Age Categories
Larger in males							
No signif. difference							
Larger in females							**NORTH AMERICA** *United States*: Harasy et al. 1997

2.1.4. Subcortical Brain Regions (Except the Hypothalamus)

All parts of the brain other than the neocortex are collectively known as the *subcortex*. The findings from studies of sex differences in these brain regions except for the hypothalamus are presented in the following tables.

2.1.4.1. Subcortical Asymmetry in General or for a Minor Region of the Subcortex

Research findings concerning sex differences in one small subcortex brain region are reported in Table 2.1.4.1. They indicate that among rats, the suprachiasmatic nucleus is more asymmetrical in males than females.

Table 2.1.4.1. Subcortical asymmetry in general or for a minor region of the subcortex.

Nature of Any Difference					Postpubertal		
						Adult	
Greater asymmetry in males						**RODENT** *Rat*: Guldner 1982 (asymmetric synapses in the SCN)	
No signif. Difference							
Greater asymmetry in females							

2.1.4.2. Amygdala, Size of

The amygdala is part of the limbic system or emotion-regulating portion of the mammalian subcortex. A few studies have investigated male-female differences in the size of the amygdala, or parts thereof. Table 2.1.4.2 indicates that in rodents, the amygdala appears to be larger than in males than in females. Regarding humans, studies have been split between finding no significant gender differences or concluding that at least portions of the amygdala are larger in males than in females.

Table 2.1.4.2. Amygdala, size of.

Nature of Any Difference	Prepubertal	Postpubertal
	Childhood	Adult
Larger in males	**NORTH AMERICA** *United States*: Caviness et al. 1996	**NORTH AMERICA** *United States*: Goldstein et al. 2001 **RODENT** *Mouse*: Koshibu et al. 2004 (medial region, 3-D MRI, C57Bl/6J strain); *Rat*: Mizukami et al. 1983; Hines et al. 1992 (posterodorsal region)
No signif. difference	**NORTH AMERICA** *United States*: Giedd et al. 1997	**NORTH AMERICA** *United States*: Murphy GM 1986 (medial region); Bryant et al. 1999 (amygdala/hippocampal complex); Gur et al. 2002
Larger in females		

2.1.4.3. Basal Ganglia, Size of

The basal ganglia are a cluster of nerve cells located at the base of the brain, comprising the putamen, caudate, globus pallidus, and substantia nigra. These nerve cells play an important role in regulating motor control. The caudate is also part of the limbic system. As shown in Table 2.1.4.3, a single study concluded that the basal ganglia of males are larger than those of females.

Table 2.1.4.3. Basal ganglia, size of.

Nature of Any Difference	Prepubertal
	Childhood
Larger in males	**NORTH AMERICA** *United States*: JN Giedd et al. 1997 (globus pallidus region, brain imaging technique)
No signif. difference	
Larger in females	

2.1.4.4. Bed Nucleus of the Stria Terminalis, Size of

The bed nucleus of the stria terminalis (or bed nucleus terminalis) is a small portion of the hypothalamus that is found in several species of mammals including humans, and is connectedf to the amygdala by way of the stria terminalis. Research has consistently shown that this segment of the hypothalamus is larger in males than in females both in humans and in rodents (Table 2.1.4.4).

Table 2.1.4.4. Bed nucleus of the stria terminalis, size of.

Nature of Any Difference	Prepubertal	Postpubertal
	Infant	Adult
Larger in males	**NORTH AMERICA** *United States*: del Abril et al. 1987	**EUROPE** *Netherlands*: Zhou et al. 1995 (measured by vasoactive intestinal peptide immunoreactivity); Zhou et al. 1997; Chung et al. 2002; Swaab 2004 **NORTH AMERICA** *United States*: LS Allen et al. 1989; LS Allen & Gorski 1990 **RODENT** *Guinea Pig*: M Hines et al. 1985; *Rat*: del Abril et al. 1987 (medial posterior regions, not lateral, ventral, or intermediate divisions); M Hines et al. 1992 (encapsultated region)
No signif. difference		
Larger in females		

2.1.4.5. Brainstem, Size of

The brainstem is the lower portion of the brain with connection to the spinal cord. The one available study on sex differences in the size of the brainstem concluded that once adjustments are made for sex differences in brain size, no significant sex difference in the brainstem size exists (Table 2.1.4.5).

Table 2.1.4.5. Brainstem, size of.

Nature of Any Difference					Postpubertal		
						Adult	
Larger in males							
No signif. difference						**NORTH AMERICA** *United States*: Filipek et al.1994:352 (relative to overall brain size)	
Larger in females							

2.1.4.6. Pyramidal Cell Field of the Hippocampus, Volume of

The pyramidal cell field is part of the hippocampus and is itself subdivisible into different sectors. Studies of sex differences in the size of this cell field have all concluded that it is larger in males than in females, at least among rats (Table 2.1.4.6).

Table 2.1.4.6. Pyramidal cell field of the hippocampus, volume of.

Nature of Any Difference					Postpubertal		
						Adult	
Larger in males						**RODENT** *Rat*: Juroska et al. 1989 (CA3); Madeira et al. 1992 (CA1); Isgor &Sengelaub 1996 (CA3); Isgor & Sengelaub 1998:191 (CA1 & CA3)	
No signif. difference							
Larger in females							

2.1.4.7. Caudate Nucleus, Size of

The caudate nucleus, also called the caudatum, is an elongated mass of grey matter located adjacent to the temporal lobes. According to two human studies, the caudate nucleus is larger in females than in males (Table 2.1.4.7).

Table 2.1.4.7. Caudate nucleus, size of.

Nature of Any Difference	Prepubertal						
				Childhood			
Larger in males							
No signif. difference							
Larger in females				**NORTH AMERICA** *United States*: JN Giedd et al. 1997 (brain-imaging study); Filipek et al. 1994 (12% larger)			

2.1.4.8. Cerebellum, Size of

Among humans and other mammals, the cerebellum is found in the posterior portion of the brain, and is clearly distinguishable from the remainder of the brain by its structure and color. Among other functions, it is important in controlling movement. Studies among humans have concluded that on average the absolute size of the cerebellum of males is larger than that of females, although adjusting for overall brain size seems to eliminate the difference (Table 2.1.4.8).

Table 2.1.4.8. Cerebellum, size of.

Nature of Any Difference					Postpubertal		Multiple Age Categories
						Adult	
Larger in males						**NORTH AMERICA** *United States*: Nopoulos et al. 2000*; Raz et al. 2001; JS Allen et al. 2002	**NORTH AMERICA** *United States*: Henery & Mayhew 1989; Raz et al. 1998 (in the vermis & ventral pons of the cerebellum)
No signif. difference						**NORTH AMERICA** *United States*: Holloway et al. 1993 (corrected for brain size); Filipek et al.1994:352 (overall brain size controlled); Nopoulos et al. 2000* (adjusted for overall brain size differences) **FISH** *Atlantic Stingray*: Puzdrowski & Leonard 1992 (caudal part of the anterior cerebellum)	
Larger in females							

2.1.4.9. Hippocampus, Size and Composition of

The hippocampus is vital to many long-term and short-term memory functions. Among humans, most studies have concluded that the hippocampus in females is larger than that of males. However, for various species of rodents (except for the mouse), studies have usually found the opposite sex difference (Table 2.1.4.9). It is likely that sex differences in the hippocampus will be species-dependent and closely related to the natural ecology of the species.

Table 2.1.4.9. Hippocampus, size and composition of.

Nature of Any Difference	Prepubertal				Postpubertal		Multiple Age Categories
				Childhood	Adolescent	Adult	
Larger in males				**RODENT** *Guinea Pig*: Bartesaghi et al. 2003; Severi et al. 2005; *Rats*: MC Diamond et al. 1982*; Juraska 1990; Roof 1993a	**RODENT** *Rats*: MC Diamond et al. 1982*	**RODENT** *Gray Squirrel*: Lavenen et al. 2000; *Meadow Vole*: LF Jacobs et al. 1990*; *Mouse*: Wimer & Wimer 1985; Wimer et al. 1988; Wimer & Wimer 1989; Tabibnia et al. 1999; *Rats*: MC Diamond et al. 1982*; MC Diamond et al. 1983; MD Madeira et al. 1988; Juraska et al. 1985; Juraska et al. 1989; E Gould et al. 1990; Madeira et al. 1991; Madeira et al. 1992; Roof & Havens 1992; Madeira & Barbosa 1993; Perifilieva et al. 2001 (Sprague-Dawley & spontaneously hypertensive rats, number of granule cells in the denate gyrus)	
No signif. difference				**NORTH AMERICA** *United States*: JN Giedd et al. 1997 (volume)		**NORTH AMERICA** *United States*: Bryant et al. 1999 (amygdalar/hippocampal complex) **BIRD** *Bay-winged Cowbird*: Reboreda et al. 1996*; *Cowbird*: Clayton et al. 1997; *Screaming Cowbird*: Reboreda et al. 1996* **RODENT** *Mouse*: Koshibu et al. 2004 (3-D MRI; C57Bl/6J strain); *Pine Vole*: LF Jacobs et al. 1990*; *Rat*: Madeira et al. 1988 (DG-GCL volume); Ignor & Sengelaub 1999 (DG-GCL volume); Tanapat et al. 1999 (young)	
Larger in females				**NORTH AMERICA** *United States*: Giedd et al. 1996*	**NORTH AMERICA** *United States*: Giedd et al. 1996*	**NORTH AMERICA** *United States*: Filipek et al. 1994 (young); Caviness et al. 1996; DGM Murphy et al. 1996; Goldstein et al. 2001 **BIRD** *Shiny Cowbird*: Reboreda et al. 1996*	**NORTH AMERICA** *United States*: JM Goldstein et al. 2001

2.1.4.10. Locus Coeruleus, Size of

The locus coeruleus is a small portion of the brain stem containing high concentrations of norepinephrine neurons and is thought to play an important role in anxiety and fear responses. In rats, the available research suggests that females have a wider locus coeruleus while the same structure for males tends to be longer, but no consistent overall size difference in the locus coeruleus has been documented (Table 2.1.4.10).

Table 2.1.4.10. Locus coeruleus, size of.

Nature of Any Difference					Postpubertal		
						Adult	
Larger in males						**RODENT** *Rats*: Babstock et al. 1997* (anterior-posterior length; dorsal ascending area to the hippocampus)	
No signif. difference						**RODENT** *Rats*: Babstock et al. 1997* (overall volume)	
Larger in females						**RODENT** *Rats*: Guillanon et al. 1988 (total volume & number of neurons); Segovia et al. 1991; Luque et al. 1992 (volume & somatic area in the anterior intermediate region); Babstock et al. 1997* (dorsal-lateral width); Kubo et al. 2003 (Wistar strain)	

2.1.4.11. Olfactory Bulb, Size of

As its name implies, the olfactory bulb is important for interpreting odors. In rats, two studies have suggested that it is larger in males than in females (Table 2.1.4.11).

Table 2.1.4.11. Olfactory bulb, size of.

Nature of Any Difference					Postpubertal		
						Adult	
Larger in males						**RODENT** *Rat*: Segovia et al. 1984 (volume); Valencia et al. 1986 (number of granule cells & number of mitral cells)	
No signif. difference							
Larger in females							

2.1.4.12. Spinal Cord (and Parts There of), Size of

Two studies – one of humans and the other of rats – have concluded that the volume of the spinal nucleus inervating the bulbocavernosus muscle is greater in males than in females (Table 2.1.4.12).

Table 2.1.4.12. Spinal cord (and parts thereof), size of.

Nature of Any Difference							
						Postpubertal	
						Adult	
Larger in males						**NORTH AMERICA** *United States*: Forger & Breedlove 1986 (spinal nucleus of the bulbocavernosus) **RODENT** *Rat*: Breedlove & Arnold 1980 (spinal nucleus of the bulbocavernosus)	
No signif. difference							
Larger in females							

2.1.4.13. Striatum, Size of

The striatum is a large division of the forebrain. It is comprised of the caudate nucleus and the putamenand is richly innervated by dopamine pathways. Functionally, it plays a central role in movement. Research in humans is mixed regarding any sex difference, and in the mouse one study revealed no significant difference (Table 2.1.4.13).

Table 2.1.4.13. Striatum, size of.

Nature of Any Difference							
						Postpubertal	
						Adult	
Larger in males						**EUROPE** *Austria*: Tauscher-Wisniewski et al. 2005 (volume of caudate using MRI)	
No signif. difference						**NORTH AMERICA** *United States*: Bryant et al. 1999 (volume of caudate using MRI) **EUROPE** *Czech Republic*: Brabec et al. 2003 (volume of striatum, caudate-accumbens, putamen, and pallidum) **RODENT** *Mouse*: Koshibu et al., 2004 (3-D MRI, C57Bl/6J strain)	
Larger in females							

2.1.4.14. Telencephalic Region, Size of

Nearly all studies of the telencephalic region (and its sub-regions) for several species of birds have concluded that this region is larger in males than in females (Table 2.1.4.14). In avian species, this large region of the brain is comprised of many smaller nuclei, including those that control song production (e.g., HVc, RA, and lMAN).

Table 2.1.4.14. Telencephalic region, size of.

Nature of Any Difference							Multiple Age Categories
Larger in males							**BIRDS** *Bay Wren*: Brenowitz et al. 1985* (volume of HVc, RA, & Area X)*; *Buff-Breasted Wren*: Brenowitz et al. 1985* (volume of HVc, RA, & Area X)*; *Carolina Wren*: Nealon & Perkel 2000 (volume of HVc); *Marsh Wren*: Canady et al. 1984 (HVc); *Orange Bishop*: Arai et al. 1989 (volume of HVc); *Slate-Coloured Boubou*: Gahr et al. 1998 (volume of HVc & RA); *White Bowed Robin Chat*: Brenowitz et al. 1985 (volume of HVc, RA, & Area X)*; *Zebra Finch*: Nottebohm & Arnold 1976; Nottebohm et al. 1976 (high vocal control center; robustus archistrialis; nucleus intercollicularis, nucleus of the 12th cranial nerve; Area X); DeVoogd & Nottebohm 1981* (size of neurons in HVc, RA, & lMAN; dendritic length in RA); Gurney 1981 (number of neurons in HVc & RA); Konish & Abatagarva 1985 (projections from HVc to RA); Arnold 1992; Clayton et al. 1997
No signif. difference							**BIRDS** *Zebra Finch*: DeVoogd & Nottebohm 1981* (dendritic length in HVc & lMAN)
Larger in females							

2.1.4.15. Septum, Size of

The septum is a region within the mammalian forebrain and is part of the limbic system. Its function is not well known, although it seems to play an important role in emotion-driven behavior, especially aggression. Studies of rodents have not reached consistent conclusions regarding the possibility of the septum being sexually dimorphic (Table 2.1.4.15).

Table 2.1.4.15. Septum, size of.

Nature of Any Difference							
						Postpubertal	
						Adult	
Larger in males							
No signif. difference						**RODENT** *Mouse*: Schaevitz & Berger-Sweeney 2005 (C57BL/6J; volume of medial septum & number of cholinergic neurons in the medial septum)	
Larger in females						**RODENT** *Rat*: Tsukahara et al. 2004 (volume)	

2.1.4.16. Thalamus, Size of

The thalamus is a bundle of nerve cells resembling an egg in size and shape, and is centrally located in the brain. This part of the brain serves to process and then route incoming sensory stimuli to various higher regions of the brain. Table 2.1.4.16 shows that females have a larger thalamus than do males according to available evidence.

Table 2.1.4.16. Thalamus, size of.

Nature of Any Difference					Postpubertal		
						Adult	
Larger in males							
No signif. difference							
Larger in females						**EUROPE** *France*: Morel 1948 (massa intermedia portion, more often detectible size); *Switzerland*: Rabl 1958 (massa intermedia portion, more often detectible size) **NORTH AMERICA** *United States*: Nopoulos 2001 (massa intermedia portion, more often detectible size)	

2.1.5. The Hypothalamus

Because of the subcomponent complexity of the hypothalamus, the findings of sex differences in the size of this brain structure and its subcomponents are reviewed separately from the remainder of the subcortex.

2.1.5.1. Hypothalamus as a Whole, Size of

The hypothalamus helps to regulate body temperature and other forms of homeostasis as well as the release of numerous hormones. The multiple functions of the hypothalamus reflects the fact that it is a very complex neuronal structure. According to Table 2.1.5.1, the hypothalamus as a whole is slightly larger among males than among females (without making adjustments for overall sex differences in brain or body size).

Table 2.1.5.1. Hypothalamus as a whole, size of.

Nature of Any Difference					Postpubertal		
						Adult	
Larger in males						**EUROPE:** *Netherlands*: Zhou et al. 2001 **NORTH AMERICA** *United States*: JM Goldstein et al. 2001	
No signif. difference							
Larger in females							

2.1.5.2. Anterior Hypothalamic Nucleus, Size of

According to a few studies of nonhumans, the dorsal portion of the anterior hypothalamic nucleus is larger in males than in females (Table 2.1.5.2).

Table 2.1.5.2. Anterior hypothalamic nucleus, size of.

Nature of Any Difference					Postpubertal		
						Adult	
Larger in males						**AMPHIBIAN** *Whiptail Lizard*: J Wade & Crews 1992 (number of neurons) **PRIMATE (EXCEPT APE)** *Japanese Macaque*: Vasey & Pfaus 2005 (dorsal portion); *Rhesus Macaque*: Byne 1998 (dorsal portion & the interstitial nuclei)	
No signif. difference							
Larger in females							

2.1.5.3. Anterior Hypothalamic Preoptic Area (AH/POA), Size of

Across several species of mammals, including humans, males appear to have a larger anterior hypothalamic preoptic area than do females, at least regarding some regions of this intricate area (Table 2.1.5.3).

Table 2.1.5.3. Anterior hypothalamic preoptic area (AH/POA), size of.

Nature of Any Difference	Postpubertal
	Adult
Larger in males	**EUROPE** *Netherlands*: Swaab & Fliers 1985 (INAH-1 region) **MUSTELID** *Ferret*: Tobet et al. 1986 **NORTH AMERICA** *United States*: LS Allen 1989* (INAH-2 & INAH-3 region); Le Vay 1991* (INAH-3); Byne et al. 2000* (INAH-2 region); Byne et al. 2001* (INAH-3 region) **PRIMATE (EXCEPT APE)** *Rhesus Macaque*: Byne 1998 **RODENT**; *Gerbil*: Commins & Yahr 1985; *Guinea Pig*: M Hines et al. 1985; *Rat*: Gorski et al. 1980
No signif. difference	**NORTH AMERICA** *United States*: LS Allen et al. 1989* (INAH-1 & INAH-4 regions); Le Vay 1991* (INAH-1, INAH-2, & INAH-4 regions); Byne et al. 2000* (INAH-1, INAH-3 regions); Byne et al. 2001* (volume, neuronal number, neuronal size, neuronal density in INAH-1, INAH-2, INAH-4; neuronal size & density in INAH-3 region)
Larger in females	

2.1.5.4. Anteroventral Periventricular (AVPv), Size of

The anteroventral periventricular (AVPv) is a portion of the rodent hypothalamus. Several studies of rats have concluded that the AVPv is larger in the brains of females compared to the brains of males, although one study reached the opposite conclusion (Table 2.1.5.4).

Table 2.1.5.4. Anteroventral periventricular (AVPv), size of.

Nature of Any Difference	Postpubertal		Multiple Age Categories
	Adolescent	Adult	
Larger in males		**RODENT** *Rat*: Blies et al. 1982	
No signif. difference			
Larger in females	**RODENT** *Rat*: Simerly et al. 1984; EC Davis et al. 1993	**RODENT** *Rat*: GJ Bloch & Gorski 1988 (young); Murakami & Arai 1989; Simerly 1998 (young); Sumida et al. 1993 (young); Ahmed et al. 1991	**RODENT** *Rat*: EC Davis et al. 1996

2.1.5.5. Medial Preoptic Area (Nucleus), Size of

Sex differences in the size of the medial preoptic area (MPA) has been determined in various species of rodents. Most of these comparisons have indicated that the MPA is larger in males.

Table 2.1.5.5. Median preoptic area (nucleus), size of.

Nature of Any Difference	Postpubertal		Multiple Age Categories
	Adolescent	Adult	
Larger in males	**RODENT** *Mouse*: Gubernick et al. 1993*	**RODENT** *Guinea Pig*: Hines et al. 1985	**RODENT** *Rat*: Gorski et al. 1978; Simerly et al. 1984; Chung et al. 2000
No signif. difference		**RODENT** *Mouse*: Gubernick et al. 1993* (young)	
Larger in females			

2.1.5.6. Paraventricular Nucleus, Size of

The paraventricular nucleus is located bilaterally along the third ventricle. It is comprised of two parts, a magnocellular division and a parvocellular division. The magnocellular division projects to the posterior pituitary and is involved in the physiological regulation of water retention. The parvocellular portion has strong projections to the median eminence, where it releases hormones that help regulate the anterior pituitary hormones involved in the stress response. There appears to be no sex differences in the size of the paraventricular nucleus (Table 2.1.5.6).

Table 2.1.5.6. Paraventricular nucleus, size of.

Nature of Any Difference	Postpubertal
	Adult
Larger in males	
No signif. difference	**EUROPE** *Netherlands*: Hofman et al. 1988 **RODENT** *Rats*: Chung et al. 2000 (volume)
Larger in females	

2.1.5.7. Sexually Dimorphic Nucleus of the Preoptic Area (SDN-POA), Size of

The sexually dimorphic nucleus of the preoptic area is located adjacent to the hypothalamus. For all species of mammals investigated (including humans). This brain structure has been repeatedly found to be considerably larger in males than in females (Table 2.1.5.7).

As an aside, a few studies have manipulated early hormonal factors by castrating male rats soon after birth (which largely halts testosterone production) and by injecting female rats neonatally with testosterone. In adulthood, this procedure resulted in an abnormal reduction of the SDN-POA in males and an increase in the size of this brain structure in females (Arnold & Gorski 1984; Gorski 1986).

Table 2.1.5.7. Sexually dimorphic nucleus of the preoptic area (SDN-POA), size of.

Nature of Any Difference	Prepubertal				Postpubertal		Multiple Age Categories
	Infant				Adolescent	Adult	
Larger in males	**RODENT** *Rat*: CD Jacobson et al. 1980 (increase in size of SDN-MPOA during 1st 10 days after birth)				**RODENT** *Rat*: Dohler et al. 1982; Dohler et al. 1984; Rhees et al. 1990	**MUSTELID** *Ferret*: Tobet et al. 1986 **NORTH AMERICA** *United States*: LS Allen et al. 1989 **PRIMATE (EXCEPT APE)** *Rhesus Macaque*: Byne 1998 **RODENT**; *Guinea Pig*: M Hines et al. 1985; *Mouse*: Bleier et al. 1982; S Robinson et al. 1985; AE Brown et al. 1999 (in most strains); *Rat*: Raisman & Field 1971; Gorski et al. 1978; Gorski et al. 1980; AP Arnold & Gorski 1984; DK Anderson et al. 1985; Larriva-Sahd 1991; EC Davis et al. 1996 **UNGULATE** *Domestic Sheep*: Roselli et al. 2004	**RODENT** *Gerbil*: D Commins & Yahr 1984a; D Commins & Yahr 1984b; *Hamster*: Greenough et al. 1977
No signif. difference							
Larger in females							

2.1.5.8. Suprachiasmatic Nucleus, Size of

The suprachiasmatic nucleus (SCN) is a small cluster of neurons located bilaterally at the base of the third ventricle. The SCN is best known as the location of the endogenous circadian clock. Findings are not entirely consistent regarding any significant sex difference in the size of this nucleus (Table 2.1.5.8).

Table 2.1.5.8. Suprachiasmatic nucleus, size of.

Nature of Any Difference					Postpubertal		
						Adult	
Larger in males						**EUROPE** *Netherlands*: Swaab et al. 1994; Zhou et al. 1995	
No signif. difference						**EUROPE** *Netherlands*: Hofman et al. 1988 **RODENT** *Guinea Pig*: Hines et al. 1985	
Larger in females							

2.1.5.9. Loss of Suprachiasmatic Nucleus

The suprachiasmatic nucleus tends to diminish in size with age. One study of rats concluded that this deterioration was more pronounced in males than in females (Table 2.1.5.9).

Table 2.1.5.9. Loss of suprachiasmatic nucleus.

Nature of Any Difference					Postpubertal		
						Adult	
Larger in males						**RODENT** *Rat*: Tsukahara et al. 2005 (faster rate & higher numbers)	
No signif. difference							
Larger in females							

2.1.5.10. Ventromedial Hypothalamus, Size of

Two studies of the ventromedial hypothalamus reached contradictory conclusions regarding the possibility of an average sex difference in the size of this hypothalamic subcomponent, although the studies involved very different species (Table 2.1.5.10).

Table 2.1.5.10. Ventromedial hypothalamus, size of.

Nature of Any Difference					Postpubertal		
						Adult	
Larger in males						**RODENT** *Rats*: Chung et al. 2000 (volume)	
No signif. difference							
Larger in females						**AMPHIBIAN** *Whiptail Lizards*: D Crews et al. 1990; J Wade & Crews 1992 (number of neurons)	

2.1.6. Age-Related Neuronal Transformations

Studies of the time needed for the brain, or parts thereof, to develop into a fully adult form are reviewed in the following tables.

2.1.6.1. Overall Brain Development Rate

The speed with which the brain assumes the physical or functional properties found in adult animals is referred to as *brain development*. Table 2.1.6.1 suggests that, at least among humans, female brains undergo more rapid development than do male brains.

Table 2.1.6.1. Overall brain development rate.

Nature of Any Difference	Prepubertal	Postpubertal
	Childhood	Adolescent
More rapid in males		
No signif. difference		
More rapid in females	**EUROPE** *England*: DC Taylor 1969	**NORTH AMERICA** *United States*: Epstein 1978:376; Hudspeth & Pribram 1990

2.1.6.2. Apoptosis (Nerve Cell Death/Neuronal Loss With Age/Neuronal Pruning)

In all animals, many more neurons are produced early in life than are present in the brains of adults. Thus, substantial cell death or pruning occurs with age and is known as *apoptosis*. A few studies have documented apoptosis occurring very early in life, but most studies measure it throughout development. Apoptosis has been shown to be greater in females than in males for several regions in the brains of rats and other rodents. In other brain regions, and for other species, no significant gender differences in apoptosis have been found (Table 2.1.6.2).

Table 2.1.6.2. Apoptosis (nerve cell death/neuronal loss with age/neuronal pruning).

Nature of Any Difference	Prepubertal	Postpubertal	Multiple Age Categories
	Infant	Adult	
More in males		**NORTH AMERICA** *United States*: Coffey 1998; Gur et al. 2002b	**RODENT** *Rat*: Tsukahara et al. 2004* (intermediate part of the later septum on postnatal day 16)
No signif. difference			**BIRD** *Zebra Finch*: Burek et al. 1997 (in the vocal control center) **RODENT** *Rat*: Davis et al. 1996 (in the lateral preoptic area); Chung et al. 2000 (in the lateral division of the bed nucleus of the stria terminalis or in the ventromedial hypothalamus & paraventricular nucleus); Tsukahara et al. 2004* (Dorsal and ventral parts of the lateral septum up to postnatal day 16 and intermediate parts on days 6, 8, and 11) **MUSTELID** *Ferret*: Park et al. 1998 (in the nucleus of the preoptic area & the anterior hypothalamus & the ventral preoptic area & the anterior hypothalamus)
More in females	**RODENT** *Rat*: Nordeen et al. 1985 (in the spinal nucleus of the bulbocavernosus); Beaston-Wimmer & Smolen 1991 (postnatal days 1-14, in the superior cervical ganglion); Davis et al. 1996 (in the central division of the medial preoptic nucleus between postnatal days 7-10)		**RODENT** *Gerbil*: Holman et al. 1996 (in the sexually dimorphic area pars compacta); *Rat*: Chung et al. 2000 (in the principal nucleus of the bed nucleus of the stria terminalis & in the medial preoptic nucleus); Nunez et al. 2001 (in the posterior cortex)

2.1.6.3. Timing of Apoptosis

One study of rats indicated that in at least one brain region, the peak in cell death came earlier in infancy for males than for females (Table 2.1.6.3).

Table 2.1.6.3. Timing of apoptosis.

Nature of Any Difference	Prepubertal
	Infant
Earlier for males	**RODENT** *Rat*: Nunez et al. 2001 (in the posterior cortex destined to be come the visual cortex)
No signif. difference	
Earlier for females	

2.1.6.4. Neocortical Brain Development Rate

The neocortex (or cerebrum) is the portion of the mammalian brain that in humans is responsible for most “higher thought” (such as making sense out of reading this book). One study found that this portion of the human brain developed more rapidly in females than in males at least during childhood (Table 2.1.6.4).

Table 2.1.6.4. Neocortical brain development rate.

Nature of Any Difference	Prepubertal
	Childhood
More rapid in males	
No signif. difference	
More rapid in females	**EUROPE** *England*: DC Taylor 1969* (speech areas of the left hemisphere)

2.1.6.5. Decrease in Brain Volume With Age

Brain cell numbers decrease with age. As a result, the volume of the brain decreases (with the exception of the cerebral spinal fluid which increases). Studies undertaken to determine if any sex differences exist in this regard have concluded that the rate of the total brain volume lost is greater in males than in females (Table 2.1.6.5).

Table 2.1.6.5. Decrease in brain volume with age.

Nature of Any Difference	Postpubertal
	Adult
Greater decline in males	**ASIA** *Japan*: Xu et al. 2000 **NORTH AMERICA** *Canada*: Witelson 1991; *United States*: CE Coffey 1998; JS Meyer 1999; Gur et al. 2001; Gur et al. 2002
No signif. difference	
Greater decline in females	

2.1.6.6. Decrease in Gray Matter With Age

Studies of the loss of gray matter with age have indicated that female losses surpass those of males (Table 2.1.6.6).

Table 2.1.6.6. Decrease in gray matter with age.

Nature of Any Difference	Postpubertal
	Adult
Greater decline in males	
No signif. difference	
Greater decline in females	**NORTH AMERICA** *United States*: Gur et al. 1999 (gray matter, proportion of total); Hommer et al. 2001 (alcoholics, amount of gray matter)

2.1.6.7. Decrease in Cerebrospinal Fluid With Age

One study indicated that males on average lose a greater proportion of cerebrospinal fluid (CSF) as they age than do females (Table 2.1.6.7).

Table 2.1.6.7. Decrease in cerebrospinal fluid with age.

Nature of Any Difference	Postpubertal
	Adult
Males lose more	**NORTH AMERICA** *United States*: Gur et al. 1999 (proportion of total)
No signif. difference	
Females lose more	

2.2
CELLS IN THE BRAIN AND SPINAL CORD

Two types of nerve cells are recognized: neurons and glia cells. There are many more glia cells than nerve cells. Traditionally, glia have been thought to support metabolic functions for nerve cells. For example, some glia manufacture myelin. As revealed in the following tables, sex differences occur in nerve cell numbers, size, and structural components. Most research on nerve cells has focused on neurons rather than on glia cells.

2.2.1. Neuronal Numbers

Research findings pertaining to the number of neurons are presented in two tables, one pertaining to neocortical portions of the brain and the other having to do with subcortical regions.

2.2.1.1. Neurons in Regions of the Neocortex, Numbers of

Sexual dimorphism in neuron numbers has been indicated in various studies, although the nature of the sex difference varies depending upon the region of the brain under consideration. Among humans, the right hemisphere of males appears to contain a greater total number of neurons than does the right hemisphere of females. On the other hand, two studies indicate that females have a greater number of neurons in posterior regions of the corpus callosum than do males. In one species of song birds, the brain region controlling song production contains more neurons in males than in females.

Table 2.2.1.1. Neurons in regions of the neocortex, numbers of.

Nature of Any Difference	Postpubertal
	Adult
More in males	**NORTH AMERICA** *United States*: DeCourten-Myer 1988 (in the right hemisphere) **BIRD** *Zebra Finch*: Burek et al. 1993 (in the brain's vocalization control centers)
No signif. difference	**NORTH AMERICA** *Canada*: Witelson et al. 1995* (among right handers, layers III, V, and VI of the TA1 region of the right hemisphere); *United States*: Rabinowicz et al. 1999 (in general) **RODENT** *Rat*: Kopcik et al. 1992 (projecting within the visual via the corpus callosum)
More in females	**NORTH AMERICA** *Canada*: Witelson 1989 (in the isthmus of the corpus callosum); Witelson et al. 1995* (among right handers, layers II and IV of the TA1 region of the right hemisphere); *United States*: S Clarke et al. 1989 (in the posterior part of the corpus callosum)

2.2.1.2. Neurons in Regions of the Subcortex in General, Numbers of

According to two studies of adults – one of humans and the other of rats – neurons in at least a few subcortical regions have been found to be greater in number for males than for females. However, a study of neonates found no sex difference in another subcortical region (Table 2.2.1.2).

Table 2.2.1.2. Neurons in regions of the subcortex in general, numbers of.

Nature of Any Difference	Prepubertal	Postpubertal
	Infant	Adult
Males have more		**EUROPE** *Netherlands*: Krvijver et al. 2000 (somotostatin neurons in the bed nucleus of the stria terminalis) **RODENT** *Rat*: Dyer et al. 1976 (in the POA projection to the medial basal hypothalamus)
No signif. difference	**RODENT** *Rat*: Beaston-Wimmer & Smolen 1991 (postnatal day 1, in the superior cervical ganglion mRNA)	
Females have more		

2.2.1.3. Neuron Size

One study of the size of neurons in the amygdala of monkeys found the neurons to be larger in males than in females, while the other study on this topic concluded the opposite, at least with respect to neurons in the left hemisphere of the neocortex [p (Table 2.2.1.3).

Table 2.2.1.3. Neuron size.

Nature of Any Difference	Postpubertal
	Adult
Larger in males	**PRIMATE (EXCEPT APE)** *Rhesus Macaque*: Bubenik & Brown 1973
No signif. difference	
Larger in females	**NORTH AMERICA** *United States*: Rabinowicz et al. 2002 (in the left hemisphere)

2.2.1.4. Neuronal Projections

One study of fleshflies concluded that only males have neurons that project specifically to the flight muscles (Table 2.2.1.4). This coincides with the fact that in this species only males engage in high-speed chases.

Table 2.2.1.4. Neuronal projections.

Nature of Any Difference	Postpubertal
	Adult
Males have more	**INSECTS** *Fleshflies*: C Gilbert & Strausfeld 1991 (in the lobula)
No signif. difference	
Females have more	

2.2.1.5. Bed Nucleus of the Stria Terminalis

The bed nucleus of the stria terminalis basically connects the amygdala with the hypothalamus, and appears to help mediate emotional responses to incoming stimuli. The available evidence is not entirely consistent regarding possible sexual dimorphism in this component of the brain (Table 2.2.1.5).

Table 2.2.1.5. Bed nucleus of the stria terminalis.

Nature of Any Difference	Postpubertal
	Adult
More among males	**RODENT** *Rat*: (projections to anteroventral periventricular nucleus of the hypothalamus and premamillary nucleus, PHA-L tract tracing, Sprague Dawley)
No signif. difference	**RODENT** *Rat*: (projections to ventromedial nucleus of the hypothalamus, PHA-L tract tracing, Sprague Dawley)
More among females	

2.2.1.6. Neurogenesis

Neurogenesis is the process by which neurons are born. During fetal development, neurogenesis occurs along the ventricles. The neurons then migrate to the appropriate position. At least in rodents, neurogenesis appears to generally either be greater in males than females or there is no significant difference (Table 2.2.1.6). This process may underlie the general dimorphism in brain size.

Table 2.2.1.6. Neurogenesis.

Nature of Any Difference	Multiple Age Categories
Males have more	**RODENT** *Mouse*: Schaevitz & Berger-Sweeney 2005* (C57BL/6J; number of cholinergic neurons in the medial septum); *Rat*: Perfilieva et al. 2001 (Sprague-Dawley & spontaneously hypertensive rats in the dentate gyrus of 5-week-old)
No signif. difference	**RODENT** *Guinea pig*: Byne et al. 1987 (number of neurons born & duration of neurogenesis in several hypothalamic nuclei); *Mouse*: Schaevitz & Berger-Sweeney 2005* (C57BL/6J; duration of neurogenesis of cholinergic neurons in the medial septum)
Females have more	

2.2.2. Nerve and Glia Cell Numbers (Density)

Two types of nerve cells are found throughout nearly all animal brains: glia and neurons. Variations in the density of these cells are covered in the following section.

2.2.2.1. Glia Cells

Originally named after the German word for *glue*, the function of glia cells in the brain remains largely unresolved, although these cells seem to have a variety of enhancing and support roles to play relative to the brain's more numerous neurons (Garcia-Sagura & McCarthy 2003). According to Table 2.2.2.1, any gender difference in the prevalence of glia cells may vary by species.

Table 2.2.2.1. Glia cells.

Nature of Any Difference	Postpubertal
	Adult
More in males	**RODENT** *Rat*: Chowen et al. 1995 (number of GFAP immunoreactivity in the median eminence & arcuate nucleus)
No signif. difference	**PRIMATE (EXCEPT APE)** *Tree Shrew*: Michaels et al. 2001
More in females	

2.2.2.2. Ratio of Neurons to Glia Cells

One study determined that in at least one region of the neocortex, male rats had a higher neuron-to-glia ratio than did females (Table 2.2.2.2).

Table 2.2.2.2. Ratio of neurons to glia cells.

Nature of Any Difference	Postpubertal
	Adult
Higher in males	**RODENT** *Rat*: McShane et al. 1988 (in the neocortex area 39)
No signif. difference	
Higher in females	

2.2.2.3. Neuronal Density

Neuronal density pertains to the number of nerve cells located within a cubic centimeter of brain tissue. According to Table 2.2.2.3, males have greater neuronal density in the neocortex than do females.

Table 2.2.2.3. Neuronal density.

Nature of Any Difference	Prepubertal	Postpubertal	
	Infant	Adolescent	Adult
Greater in males		**NORTH AMERICA** *United States*: Pakkenberg & Gundersen 1997* (in the neocortex); Rabinowicz et al. 1999 (in the neocortex)	**NORTH AMERICA** *United States*: Pakkenberg & Gundersen 1997* (in the neocortex)
No signif. difference	**RODENT** *Rat*: Nunez et al. 2001 (postnatal days 2-35, in the posterior cortex)		
Greater in females			

2.2.2.4. Neuronal Ganglia and Preganglia

Ganglia and preganglia are structures associated with the autonomic nervous system. Both are located outside the central nervous system and contain a synapse. All available studies (none of which involve humans) indicate that males have more cells in these neuronal structures than do females (Table 2.2.2.4).

Table 2.2.2.4. Neuronal ganglia and preganglia.

Nature of Any Difference							
					Postpubertal		
						Adult	
More in males						**FELINE** *Cat*: R Baron et al. 1985 **RODENT** *Guinea Pig*: McLochlan 1985; *Mouse*: Suzuki & Arai 1986; *Rat*: Dail et al. 1975 (neuronal ganglia); Nadelhaft & Booth 1984; Papka & Trauring 1985 (neuronal ganglia); D Greenwood et al. 1985; Nadelhaft & McKenna 1987; Papka et al. 1987 (neuronal ganglia); BW Newton & Hamill 1988; Keast & Groat 1989 (neuronal ganglia); Pacheco et al. 1989 (neuronal ganglia); BW Newton et al. 1990; BW Newton 1992	
No signif. difference							
More in females							

2.2.3. Specialized Types of Neurons

Some neurons perform special functions associated with the chemical substance they release in order to communicate with other cells in the body (either a transmitter substance or a hormone).

2.2.3.1. Corticotropin-Releasing Hormone Containing Neurons, Numbers of

Neurons containing cortocotropin-releasing hormone have been found to be greater in number in at least one subcortical region of the rat brain of females relative to the same region in male rats (Table 2.2.3.1).

Table 2.2.3.1. Corticotropin-releasing hormone containing neurons, numbers of.

Nature of Any Difference							
					Postpubertal		
						Adult	
More in males							
No signif. difference							
More in females						**RODENT** *Rat*: Funabashi 2003 (Wister, in the preoptic area of the bed nucleus & the stria terminalis)	

2.2.3.2. Dopaminergic Neurons, Number of

According to one study of rats, males have more neurons that utilize the neurotransmitter dopamine than do females in at least one subcortical region (Table 2.2.3.2).

Table 2.2.3.2. Dopaminergic neurons, number of.

Nature of Any Difference							
					Postpubertal		
						Adult	
More in males						**RODENT** *Rat*: Simerly et al. 1985 (in the anteroventral periventricular nucleus)	
No signif. difference							
More in females							

2.2.3.3. Dopaminergic Neurons, Size of

One study of rats compared the size of dopaminergic nerve cells and concluded that those in males were larger than those in females (Table 2.2.3.3).

Table 2.2.3.3. Dopaminergic neurons, size of.

Nature of Any Difference							
					Postpubertal		
						Adult	
Larger in males						**RODENT** *Rat*: Reisert & Pilgrim 1991 (30% larger)	
No signif. difference							
Larger in females							

2.2.3.4. Motoneurons, Number of

Studies among multiple species of mammals (including humans) have found greater numbers of motoneurons (or motor neurons) in the spinal cords of males relative to females (Table 2.2.3.4). For non-mammals, however, sex differences in motoneurons have not been detected.

Table 2.2.3.4. Motoneurons, number of.

Nature of Any Difference					Postpubertal
					Adult
More in males					**NORTH AMERICA** *United States*: Forger & Breedlove 1986 (in Onuf's nucleus of the spinal cord) **CANINE** *Dog*: Forger & Breedlove 1986 (in Onuf's nucleus of the spinal cord); *Hyena*: Forger et al. 1996 (in the Onuf's nucleus) **RODENT** *Rat*: CL Jordan et al. 1982 (in the dorsolateral motor nucleus of the spinal cord); Nordeen et al. 1985 (in the spinal nucleus of the bulbocavernosus)
No signif. difference					**AMPHEBIAN** *Green Anole*: O'Bryant & Wade 1999 (in the vagal portion of the nucleus ambiguus and ventral motor nucleus of facial nerves) **BIRD** *Zebra Finch*: J Wade & Buhlman 2000 (number and size of neurons in vocal organ)
More in females					

2.2.3.5. Muscle Innervation

According to one study of rats, males had much greater muscle innervation than did females (Table 2.2.3.5).

Table 2.2.3.5. Muscle innervation.

Nature of Any Difference					Postpubertal
					Adult
More in males					**RODENT** *Rat*: CL Jordan et al. 1982 (ischiocavernosus muscle innervation by dorsolateral motor nucleus neurons)
No signif. difference					
More in females					

2.2.3.6. Nucleus Ambiguus

As one of the cranial nerves, the nucleus ambiguous plays a central role in swallowing. As shown in Table 2.2.3.6, males appear to have larger and more complexly developed nerves in the nucleus ambiguous, at least among one amphibian species.

Table 2.2.3.6. Nucleus ambiguus.

Nature of Any Difference					Postpubertal
					Adult
Larger in males					**AMPHIBIAN** *Green Anole*: O'Bryant & Wade 1999 (soma size in area X & nerve cross section for nerves)
No signif. difference					
Larger in females					

2.2.3.7. Somatostatin Neurons, Number of

Somatostatin is a hormone produced by various cells of the body, including certain nerve cells within the hypothalamus. One study found greater numbers of somatostatin producing neurons in the brains of males than in those of females (Table 2.2.3.7).

Table 2.2.3.7. Somatostatin neurons, number of.

Nature of Any Difference					Postpubertal
					Adult
Males have more					**EUROPE** *Netherlands*: Kruiver et al. 2000 (in the bed nucleus of the stria terminalis)
No signif. difference					
Females have more					

2.2.4. Neuronal Component Structures

The structures of various subcomponents of neurons have been investigated by researchers with respect to sex differences. Results from these studies are summarized below.

2.2.4.1. Axons (Neurites), Number of

Research findings have not been consistent with regard to any gender differences in the numbers of axons in various areas of the brain (Table 2.2.4.1).

Table 2.2.4.1. Axons (neurites), number of.

Nature of Any Difference	Postpubertal	
	Adolescent	Adult
More in males		**RODENT** *Rat*: Kim & Juraska 1997* (young, in the splenium of the corpus callosum)
No signif. difference	**RODENT** *Rat*: Kim & Juraska 1997* (in the splenium of the corpus callosum)	
More in females	**EUROPE** *Switzerland*: Rabinowicz et al. 2002 **RODENT** *Rat*: Loy & Milner 1980 (axonal sprouting in the hippocampus)	**RODENT** *Rat*: Juraska & Kopcik 1988 (in the splenium of the corpus callosum); Kin & Juraska 1993 (in the splenium of the corpus callosum)

2.2.4.2. Axon Withdrawal, Age of Onset

One study of the age at which axon withdrawal begins found it to be earlier in males than in females, at least in a portion of the rat corpus callosum (Table 2.2.4.2).

Table 2.2.4.2. Axon withdrawal, age of onset.

Nature of Any Difference	Multiple Age Categories
Earlier in males	**RODENT** *Rat*: Kim & Juraska 1997* (in splenium of the corpus callosum)
No signif. difference	
Earlier in females	

2.2.4.3. Dendrites/Primary Dendrites, Number of

Dendrites extend from neurons in order to obtain information from other nerve cells, both adjacent and more distant. One study found that female rats had greater numbers of dendrites than did males in one type of hyppocampal cells but not in another (Table 2.2.4.3).

Table 2.2.4.3. Dendrites/primary dendrites, number of.

Nature of Any Difference	Postpubertal
	Adult
More in males	
No signif. difference	**RODENT** *Rat*: E Gould et al. 1990* (on the CA1 pyramidal cells of the hippocampus)
More in females	**RODENT** *Rat*: E Gould et al. 1990* (on the CA3 pyramidal cells of the hippocampus)

2.2.4.4. Dendritic Lengths

According to one study, no significant sex differences were found in the length of the dendrites, at least within a portion of the hypothalamus, while another study found some differences in the visual cortex of rodents (Table 2.2.4.4).

Table 2.2.4.4. Dendritic lengths.

Nature of Any Difference	Prepubertal	Postpubertal
	Early Childhood	Adolescent
More in males		
No signif. difference		**RODENT** *Rat*: Juraska 1990 (length of dendritic trees & lengths of segments in the granule cells of the dentate gyrus of the hippocampus)
More in females	**RODENT** *Rat*: Seymoure & Juraska 1992 (at weaning, in the monocular subfield of the visual cortex neurons)	

2.2.4.5. Dendritic Segments, Numbers of

According to one study among rats, females have a greater number of dendritic segments than do males (Table 2.2.4.5).

Table 2.2.4.5. Dendritic segments, numbers of.

Nature of Any Difference	Postpubertal
	Adolescent
More in males	
No signif. difference	
More in females	**RODENT** *Rat*: Juraska 1990 (in granule cells of dentate gyrus-hippocampus)

2.2.4.6. Dendritic Spines/Dendritic Branching, Number of

Often extending from the primary trunk of a dendrite are several secondary branches or spines. As shown in Table 2.2.4.6, several studies of various species of rodents have concluded that among adults, greater dendritic branching is found in the neurons of males than of females. However, among prepubertal animals, this pattern is not found.

Table 2.2.4.6. Dendritic spines/dendritic branching, number of.

Nature of Any Difference	Prepubertal		Postpubertal
	Infant	Early Childhood	Adult
More in males			**RODENT** *Hamster*: Greenough et al. 1977 (in the POA of the hypothalamus); *Meadow Vole*: Kavaliers et al. 1998 (in parietal and prefrontal cortex); *Mouse*: Juraska et al. 1985 (in the hippocampus); Juraska et al. 1989 (in the hippocampus); *Rat*: Raisman & Field 1973 (in the POA of the hypothalamus); Madeira et al. 1991 (in the hippocampus); Parducy & Garcia-Segura 1993 (in the hippocampus); Rasia-Filho et al. 2004 (in the medial region of the amygdala)
No signif. difference	**RODENT** *Rat*: Munoz-Cueto et al. 1990 (postnatal day 10, in the visual cortex)		
More in females		**RODENT** *Rat*: Seymoure & Juraska 1992 (at weaning, longer bifurcating of the visual cortex neurons)	

2.2.4.7. Changes in Dendritic Spines With Age

One study of rats concluded that the number of dendritic spines increased with age more in males than in females; in fact, females actually exhibited a decrease during the same time frame (Table 2.2.4.7).

Table 2.2.4.7. Changes in dendritic spines with age.

Nature of Any Difference	Multiple Age Categories
Greater increase in males	**RODENT** *Rat*: Munoz-Cueto et al. 1990 (from postnatal days 20 through 60 s 10, pyramidal cells in the visual cortex)
No signif. difference	
Greater increase in females	

2.2.4.8. Changes in Dendritic Structures in Response to Environmental Complexity

One study of rats suggested that males exhibited a greater increase in the length and degree of branching of dendrites in their visual cortex relative to females when both were exposed to equal degrees of environmental enrichment (Table 2.2.4.8).

Table 2.2.4.8. Changes in dendritic structures in response to environmental complexity.

Nature of Any Difference	Postpubertal
	Adult
More in males	**RODENT** *Rat*: Juraska 1984 (dendritic branching and lengths in the visual cortex)
No signif. difference	
More in females	

2.2.4.9. Mossy Fiber Synapses

There are two mossy fiber systems in the mammalian brain, one in the hippocampus and one in the cerebellum. Granule cells in the dentate gyrus (a part of the hippocampus) send axons, the mossy fibers, to the CA3 region of the hippocampus. Given the role of the hippocampus in memory and emotion, it seems likely that mossy fiber systems may facilitate these functions. Studies have reached inconsistent conclusions about any sex differences in the prevalence or in the forms of mossy fiber synapses among rats (Table 2.2.4.9).

Table 2.2.4.9. Mossy fiber synapses.

Nature of Any Difference					Postpubertal		
						Adult	
More in males						**RODENT** *Rat*: Parducz & Garcia-Segura 1993 (in the hilus of dentate gyrus of the hippocampus); Madeira et al. 1995* (Sprague-Dawley rats; volume of mossy fiber system)	
No signif. difference						**RODENT** *Rat*: Madeira et al. 1995* (Sprague-Dawley rats; total number of synapses in the dentate gyrus)	
More in females						**RODENT** *Rat*: Madeira et al. 1995* (Sprague-Dawley rats; density of synapses in the dentate gyrus)	

2.2.4.10. Neuronal Nuclei, Diameter of

The cell's nucleus primarily houses its DNA. Two studies of rats found that the nuclei of the neurons within the amygdala and the hypothalamus are larger in males than in females (Table 2.2.4.10). This size difference may reflect differing degrees of information exchanged between the nuclei and their surrounding cytoplasm.

Table 2.2.4.10. Neuronal nuclei, diameter of.

Nature of Any Difference					Postpubertal		
						Adult	
Larger in males						**RODENT** *Rat*: Pfaff 1966 (in the POA of the hypothalamus); Staudt & Dorner 1976 (in the amygdala)	
No signif. difference							
Larger in females							

2.2.4.11. Synaptic Junctions, Number of

Findings surrounding any gender differences in the density of synaptic junctions in the brain have come to inconsistent conclusions, at least in the case of rats. The one study of humans found females exhibiting greater density than males (Table 2.2.4.11).

Table 2.2.4.11. Synaptic junctions, number of.

Nature of Any Difference					Postpubertal		
						Adult	
More in males						**RODENT** *Rat*: Matsumoto & Arai 1980* (axosomatic synapses in the arcuate nucleus); Nishizuka & Arai 1981a (young, in the amygdala); Nishizuka & Arai 1981b (young); Guldner 1982; Matsumoto & Arai 1986; Reid & Juraska 1992 (in the binocular visual cortex)	
No signif. difference							
More in females						**EUROPE** *Switzerland*: Rabinowicz et al. 2002 (young) **RODENT** *Rat*: Raisman & Field 1973 (young, nonstrial synapses in the hypothalamic POA); Matsumoto & Arai 1980* (spine synapses in the arcuate nucleus); Guldner 1982	

2.2.4.12. Synaptic Junctions, Length of

One study of the brains of rats concluded that the synaptic junctions between neurons were larger in females than in males (Table 2.2.4.12).

Table 2.2.4.12. Synaptic junctions, length of.

Nature of Any Difference					Postpubertal		
						Adult	
More in males							
No signif. difference							
More in females						**RODENT** *Rat*: SN Reid & Juraska 1992	

2.3
NEUROLOGICAL FUNCTIONING

Neurological functioning refers to any electrochemical changes that occur within the brain or spinal cord. A variety of techniques have been developed for monitoring these changes, ranging from relatively simple electroencephalograms (EEGs) to much more complex functional magnetic resonance imaging (fMRIs).

2.3.1. General Neurological Functioning

General neurological functioning can be measured in a number of ways, ranging from the use of electrodes on the scalp to detect brain wave activity to more complex methods of magnetic brain scanning.

2.3.1.1. Brain Waves, Speed of

Brain waves, as measured by electroencephalographs (EEGs), occur at widely varying oscillating rates. One study found that during sleep, male brain waves were faster on average than were those of females, while another study concluded that males exhibited faster brain waves following a period of sleep deprivation than did females (Table 2.3.1.1).

Table 2.3.1.1. Brain waves, speed of.

Nature of Any Difference					Postpubertal		
						Adult	
More rapid in males						**ASIA** *Japan*: Fukuda et al. 1999 (during sleep) **NORTH AMERICA** *United States*: R Armitage et al. 2001 (following sleep deprivation)	
No signif. difference							
More rapid in females							

2.3.1.2. EEG Power

EEG power (or EEG response amplitude) refers to the overall degree of brain activity as revealed through movements in the electroencephalograph (usually in response to a standard set of testing conditions). According to studies summarized in Table 2.3.1.2, human females exhibit greater EEG power than do males. One study of rats reached the same conclusion at least regarding delta brain waves.

Table 2.3.1.2. EEG power.

Nature of Any Difference					Postpubertal		Multiple Age Categories
						Adult	
Greater in males							
No signif. difference							
Greater in females						**EUROPE** *Spain*: Harmony et al. 1990 **NORTH AMERICA** *United States*: Jerger 1980 (to acoustic signals); Dijk et al. 1989 (young); R Armitage et al. 1995 (delta waves among depressed persons); Briere et al. 2001 (young, delta waves) **RODENT** *Rat*: Juarez et al. 1995 (delta activity in the whole brain)	**ASIA** *Japan*: Matssura et al. 1985

2.3.1.3. Theta Brain Wave Activity/Power, Amount of

Several studies that have specifically monitored theta brain wave activity (which tend to be slow relative to alpha and delta waves, the latter being associated with sleep) all concluded that males exhibit more theta wave activity than do females (Table 2.3.1.3).

Table 2.3.1.3. Theta brain wave activity/power, amount of.

Nature of Any Difference					Postpubertal	
						Adult
More in males						**EUROPE** *Spain*: Lorenzo et al. 1995 **LATIN AMERICA** *Mexico*: Corsi-Cabrera et al. 2002 (after prolonged sleep deprivation); Corsi-Cabrera et al. 2003 (after prolonged sleep deprivation) **NORTH AMERICA** *United States*: DP Brunner et al. 1993; Dumont et al. 1999; JA Caldwell et al. 2000; Forest & Godbout 2000 (young) **RODENT** *Rat*: Juarez et al. 1995 (power in the whole brain)
No signif. difference						
More in females						

2.3.1.4. Amygdala Activation in General

The mammalian amygdala is an almond-shaped structure located deep inside the subcortex on each side adjacent to the temporal lobes of the neocortex. This ancient brain structure plays a key role in regulating emotions. According to two studies, the amygdala of males is more intensely activated during negative emotional experiences than is that of females (Table 2.3.1.4).

Table 2.3.1.4. Amygdala activation in general.

Nature of Any Difference					Postpubertal	
						Adult
More in males						**NORTH AMERICA** *United States*: Schneider et al. 2000 (when feeling sad); Cahill et al. 2001 (negative emotions, PET scan)
No signif. difference						
More in females						

2.3.1.5. Auditory Evoked Response

The auditory evoked response (AER) refers to specific types of brain wave patterns resulting from performance of various auditory tasks. Table 2.3.1.5 suggests that females exhibit greater AERs under standard testing conditions than do males.

Table 2.3.1.5. Auditory evoked response.

Nature of Any Difference					Postpubertal	
						Adult
Greater in males						
No signif. Difference						
Greater in females						**NORTH AMERICA** *United States*: Buchsbaum & Silverman 1968 (hypersensitive AER amplitude); Hetrick et al. 1996 (magnitude); Rojas et al. 1999 (lingering of the M100 AER)

2.3.1.6. Event-Related Potential

Event-related potential (ERP) involves the averaging of brain wave response patterns to multiple specific stimuli presented to subjects at irregular intervals. One study of subjects performing a mental rotation task concluded that males and females were statistically equivalent in the ERP response patterns (Table 2.3.1.6).

Table 2.3.1.6. Event-related potential.

Nature of Any Difference					Postpubertal	
						Adult
Greater in males						
No signif. difference						**NORTH AMERICA** *Canada*: Desrocher et al. 1995:13 (during a mental rotation task)
Greater in females						

2.3.1.7. Cerebellar Activity

The cerebellum is a structure at the posterior of the mammalian brain that specializes in performing certain coordination skills. According to one study, men exhibit more cerebellar activation than women when both are trying to perform a task involving remembering specific pitches (Table 2.3.1.7).

Table 2.3.1.7. Cerebellar activity.

Nature of Any Difference	Postpubertal
	Adult
More in males	
No signif. difference	
More in females	**MIDDLE EAST** *Israel*: Gaab et al. 2003 (pitch memory task)

2.3.1.8. Neocortical Control Over Subcortical Brain Activity

Two of three research findings concerning which sex uses regions of the neocortex to alter or suppress subcortical activity have concluded that females do so to a greater extent than males (Table 2.3.1.8).

Table 2.3.1.8. Neocortical control over subcortical brain activity.

Nature of Any Difference	Postpubertal	Multiple Age Categories
	Adult	
Greater in males	**ASIA** *Japan*: Shirao et al. 2005 (young, prefrontal cortical activation when listening to unpleasant words concerning body image)	
No signif. difference		
Greater in females	**OCEANIA** *Australia*: AH Kemp et al. 2004 (young, reduced latency of discharge by frontal lobes to unpleasant images)	**NORTH AMERICA** *United States*: Kilgore et al. 2001 (children & adolescents, frontal lobes dampen amygdala activity)

2.3.1.9. Subcortical (Versus Neocortical) Brain Activity

A few studies have compared the degree to which the subcortex is activated when subjects are given various cognitive or perceptual tasks. As shown in Table 2.3.1.9, males appear to activate various subcortical regions to a greater extent than females when they are required to process emotion-provoking or sexual stimuli. However, one study that required a sample of both sexes to listen to unpleasant words having to do with body image found greater female than male activation of the amygdala.

Table 2.3.1.9. Subcortical (versus neocortical) brain activity.

Nature of Any Difference	Postpubertal
	Adult
Greater in males	**EUROPE** *Germany*: F Schneider et al. 2000 (college, amygdala activation when processing sadness-evoking stimuli) **NORTH AMERICA** *United States*: Kilgore & Yurgelin-Todd 2001 (amygdala activation to emotion-provoking stimuli); Karama et al. 2002 (college, hypothalamus & thalamus activation to sexual stimuli)
No signif. difference	
Greater in females	**ASIA** *Japan*: Shirao et al. 2005 (young, amygdala activation when listening to unpleasant words concerning body image)

2.3.1.10. GABAergic Brain Activity

GABA is a major and largely inhibitory transmitter in the brain. Unusual GABAergic organization has been associated with epilepsy and schizophrenia. One study indicated that among rats, greater GABAergic brain activity was taking place in males than in females (Table 2.3.1.10).

Table 2.3.1.10. GABAergic brain activity.

Nature of Any Difference	Postpubertal
	Adult
More in males	**RODENT** *Rat*: Grattan & Selmanoff 1997 (in medial preoptic nucleus and ventro-medial nucleus)
No signif. difference	
More in females	

2.3.1.11. Long Term Depression of Neuronal Firing

After the same neurons have repeatedly been activated, they tend to exhibit some deterioration in firing potential. According to one study of rats, the extent to which this is true was the same for both sexes (Table 2.3.1.11).

Table 2.3.1.11. Long term depression of neuronal firing.

Nature of Any Difference					Postpubertal
					Adult
More in males					
No signif. Difference					**RODENT** *Rat*: Kashel et al. 2004 (in vitro slices of the lateral nucleus of the amygdala)
More in females					

2.3.1.12. Motoneuron Firing

One study indicated that among rabbits, the motoneuron firing in the master muscle network was more rapid in males than in females although there was no sex difference in the duration of notoneuron firing (Table 2.3.1.12).

Table 2.3.1.12. Motoneuron firing.

Nature of Any Difference					Postpubertal
					Adult
More in males					**RODENT** *Rabbit*: AW English & Widner 2003* (masseter, firing rapidity)
No signif. Difference					**RODENT** *Rabbit*: AW English & Widner 2003* (masseter, firing duration)
More in females					

2.3.1.13. Neurological Responses to Odors

Using a variety of measures, researchers have investigated sex differences in neurological responses to odors. Most studies have indicated that females exhibit stronger responses than males (Table 2.3.1.13).

Table 2.3.1.13. Neurological responses to odors.

Nature of Any Difference					Postpubertal	Multiple Age Categories
					Adult	
More in males					**NORTH AMERICA** *United States*: LM Levy et al. 1997 (fMRI)	
No signif. Difference					**NORTH AMERICA** *United States*: Bengtsson et al. 2001	
More in females					**NORTH AMERICA** *United States*: E Becker et al. 1993 (event-related potentials); LM Levy et al. 1999 (fMRI to familiar odors); Yousem et al. 1999 (fMRI)	**NORTH AMERICA** *United States*: WJ Evans et al. 1995 (event-related potential)

2.3.2. fMRI Responses

Magnetic resonance images are sometime performed as subjects are engaged in various cognitive or behavioral tasks. These recorded images are known as functional MRI (or fMRI).

2.3.2.1. fMRI Responses to Auditory Cues

According to one study, females exhibited greater fMRI activity in the occipital portion of the neocortex in response to auditory cues than did males (Table 2.3.2.1).

Table 2.3.2.1. fMRI responses to auditory cues.

Nature of Any Difference					Postpubertal
					Adult
Greater in males					
No signif. Difference					
Greater in females					**NORTH AMERICA** *United States*: Hedera et al. 1998 (occipital cortex in response to changes in tone)

2.3.2.2. fMRI Responses in General

One study reported greater functional magnetic resonance imaging patterns in both males and females, depending on specific types of tasks and experiences (Table 2.3.2.2).

Table 2.3.2.2. fMRI responses in general.

Nature of Any Difference						Multiple Age Categories
Greater in males						**NORTH AMERICA** *United States*: Canli et al. 2002* (activity in right & left amygdala & associated structures during emotional memory formation)
No signif. difference						
Greater in females						**NORTH AMERICA** *United States*: Canli et al. 2002* (activity in brain regions other than the amygdala correlated with emotional experiences)

2.3.2.3. P300 Amplitude

The P300 amplitude refers to a characteristic spike in a series of average brain wave patterns in response to a set of specific stimuli. According to two studies cited in Table 2.3.2.3, the brains of females generally exhibit greater P300 amplitude than do those of males. However, one exceptional study found that when shown physically attractive human faces, males exhibited greater P300 amplitude than did females.

Table 2.3.2.3. P300 amplitude.

Nature of Any Difference						Postpubertal	
						Adult	
Males more						**NORTH AMERICA** *United States*: Oliver-Rodriguez et al. 1999 (in response to physically attractive human faces)	
No signif. difference							
Females more						**NORTH AMERICA** *United States*: Polich & Geisler 1991; Deldin et al. 1994	

2.3.3. Functional Neocortical Asymmetry

The two sides of the brain have been found to often function differently, particularly in the case of the neocortex. The following tables summarize the findings in this regard.

2.3.3.1. Hemispheric Specialization (Asymmetry in Neocortical Functioning)

Hemispheric specialization (also called *functional lateralization* and *inter-hemispheric discoupling*) refers to the degree to which the two hemispheres function independently when performing various types of cognitive tasks. Assessing hemispheric specialization usually involves monitoring EEG brain waves or functional magnetic resonance imaging (fMRI) scans.

As shown in Table 2.3.3.1, at least among humans, the hemispheres for males appear to be more specialized (or lateralized) than those of females. This means that when performing intellectual tasks, both of the two hemispheres of female brains tend to activate in concert and to equal degrees. In males, on the other hand, the left hemisphere tends to function more than the right hemisphere when performing language-related tasks while the right hemisphere usually activates more distinctly when performing tasks involving spatial reasoning. This sex difference appears to extend down into subcortical regions such as the amygdala. Reviews of the literature based on much of the research cited in this table have concurred with this basic conclusion (Hiscock et al. 1994; Shaywitz et al. 1995).

Table 2.3.3.1. Hemispheric specialization (asymmetry in neocortical functioning).

Nature of Any Difference	Prepubertal				Postpubertal		Multiple Age Categories
				Childhood		Adult	
Greater in males				**EUROPE** *England*: Shaywitz et al. 1995 (when performing a language task); Everhart et al. 2001		**ASIA** *Russia*: Volf & Razumnikova 1999 (college); Razoumnikova 2004 (greater right hemispheric activation during mental arithmetic) **EUROPE** *Britain*: Rossell et al. 2002 (during visual word recognition task); *Poland*: Nowicka & Fersten 2001 **MIDDLE EAST** *Israel*: Gaab et al. 2003 (pitch memory task) **NORTH AMERICA** *Canada*: Harshman et al. 1983; Kimura 1983 (young); *United States*: McGlone & Davidson 1973 (left-right asymmetry in performing spatial learning tasks); Hannay & Malone 1976 (left-right asymmetry in performing verbal tasks); Bradshaw et al. 1977 (left-right asymmetry in performing verbal tasks); Davidoff 1977 (left-right asymmetry in performing spatial learning tasks); Rizzolatti & Buchtel 1977 (left-right asymmetry in performing spatial learning tasks); Beaumont et al. 1978 (hemispheric power asymmetry); Bradshaw & Gates 1978 (left-right asymmetry in performing verbal tasks); Kail & Siegel 1978 (left-right asymmetry in performing verbal tasks); Levy & Reid 1978 (left-right asymmetry in performing spatial learning tasks); Bryden 1979 (left-right asymmetry in performing verbal tasks); Bryden 1982; Bryden 1988; Azari et al. 1992 (young); Pardo et al. 1993 (imaging sadness experiences); Azari et al. 1995 (young); MS George et al. 1995 (college, imaging during induced-sadness task); JC Gore 1996; RD Lane et al. 1997 (during induced sadness); JJ Jaeger et al. 1998 (when engaged in language tasks); Satado et al. 2000 (asymmetric activation of dorsal premotor cortex during a tactile discrimination task); Vikingstad et al. 2000 (among right handers); Kansaku & Kitazawa 2001 (when interpreting sentences); WDS Kilgor & Yurgelun-Todd 2001 (amygdala when engage in facial affect recognition task); MD Phillips et al. 2001 (while listening to speech); Saucier & Elias 2001; Coney 2002 (when performing cognitive tasks); Rossell et al. 2002	**NORTH AMERICA** *Canada*: McGlone & Davidson 1973; Lake & Bryden 1976; McGlone 1977; McGlone 1978; *United States*: Hannay & Malone 1976; Code 1987:13; Azari et al. 1995; Russo et al. 2000
No signif. difference						**NORTH AMERICA** *United States*: Kershner & Jeng 1972 (left-right asymmetry in performing spatial learning tasks); Hannay & Boyer 1978 (left-right asymmetry in performing verbal tasks); Leehey et al. 1978 (left-right asymmetry in performing spatial learning tasks); Piazza 1980 (left-right asymmetry in performing verbal tasks)	**NORTH AMERICA** *United States*: JA Frost et al. 1999
Greater in females						**NORTH AMERICA** *United States*: Reite et al. 1997 (schizophrenic subjects)	

2.3.3.2. Interhemispheric Coherence

Interhemispheric coherence (also called *hemispheric collaboration*) refers to the extent to which the two hemispheres essentially work in tandem to perform one or more mental tasks. Thus, the concept is essentially the opposite of hemispheric specialization (see the preceeding table). All of the available research has concluded that females exhibit greater interhemispheric coherence (or consistency) than do males (Table 2.3.3.2).

Table 2.3.3.2. Interhemispheric coherence.

Nature of Any Difference					Postpubertal		
						Adult	
Males more							
No signif. difference							
Females more						**EUROPE** *Poland*: Nowicka & Fersten 2001 (faster transfer of linguistic information); *Spain*: Corsi-Cabrera et al. 1989 **NORTH AMERICA** *Canada*: Flor-Henry et al. 1987; *United States*: Beaumont et al. 1978; Wyler et al. 1987; FB Wood et al. 1991; Cadalbert et al. 1994; Duffy et al. 1996; Haverkort et al. 1999 (in the anterior region during comprehension) **BIRD** *Domestic Chicken*: Tommasi & Vallortigara 2004:94 (when performing spatial reasoning tasks) **RODENT** *Rat*: Juarez et al. 1995 (between hemisphere correlations in alpha, delta, & theta brain waves)	

2.3.3.3. Lateralization of Neurotransmitters

One study sought to determine if dopamine levels in rat brains were lateralized differently by sex. It found no significant male-female differences, at least among newborns (Table 2.4.3.3).

Table 2.3.3.3. Lateralization of neurotransmitters.

Nature of Any Difference	Prepubertal						
	Infant						
Greater in males							
No signif. difference	**RODENT** *Rat*: Afonso et al. 1993 (postnatal day 1, of dopamine)						
Greater in females							

2.3.3.4. Right Hemispheric Brain Activity/Activation

Research findings concerning sex differences in the activation of the right hemisphere have reached mixed conclusions (Table 2.3.3.4). These varying conclusions appear to partially reflect the different portions of the hemispheres monitored and the tasks and stimuli presented to subjects.

Table 2.3.3.4. Right hemispheric brain activity/activation.

Nature of Any Difference	Prepubertal				Postpubertal		Multiple Age Categories
	Infant					Adult	
Greater in males	**NORTH AMERICA** *United States*: Shucard et al. 1981:93 (3-month olds, auditory evoked potential in response to verbal & nonverbal stimuli)					**ASIA** *Japan*: Imaizumi et al. 2004 (in the frontal medial cortex when interpreting emotion-laden speech) **NORTH AMERICA** *United States*: Baumann et al. 1991 (young); Reite et al. 1993 (college, anterior); Haverkort et al. 1999; Henkin & Levy 2001 (in response to unpleasant odors); Gur et al. 2002a (right inferior parietal lobe, when performing a spatial reasoning task)	**NORTH AMERICA** *United States*: Gur et al. 2000 (faster to activate when performing spatial reasoning)
No signif. difference						**NORTH AMERICA** *United States*: RL Buckner et al. 1995 (college, during speech); CJ Price et al. 1996 (college, during reading)	
Greater in females						**NORTH AMERICA** *United States*: Schlosser et al. 1998 (young, in the frontal cortex during speech); Gron et al. 2000 (in the frontal lobes during spatial reasoning tasks); Grabowski et al. 2003 (homologous to Broca's area, when engaged in visual object-naming task)	**NORTH AMERICA** *United States*: Paulson et al. 1998 (response to pain)

2.3.3.5. Left Hemispheric Brain Activity/Activation

Unlike research involving right hemispheric functioning (above), the available studies on sex differences in left hemispheric functioning have failed to reveal any overall differences (Table 2.3.3.5).

Table 2.3.3.5. Left hemispheric brain activity/activation.

Nature of Any Difference	Prepubertal				Postpubertal		Multiple Age Categories
	Infant					Adult	
Greater in males						**EUROPE** *Britain*: Shaywiz et al. 1995 (when performing semantic judgment tasks) **NORTH AMERICA** *United States*: Bookheimer et al. 1995 (when naming visual objects); Pugh et al. 1996 (when performing semantic judgment tasks); Jaeger et al. 1998 (when performing semantic judgment tasks); Chao et al. 1999 (when naming visual objects); Murtha et al. 1999 (when naming visual objects); Etard et al. 2000 (when naming visual objects); A Martin et al. 2000 (when naming visual objects); Kesler-West et al. 2001 (fMRI); Whatmough et al. 2002 (when naming visual objects); Grabowski et al. 2003 (when naming visual objects)	
No signif. difference						**EUROPE** *Germany*: Schirmer et al. 2002 (when performing semantic judgment tasks) **NORTH AMERICA** *United States*: JA Frost et al. 1995 (when performing semantic judgment tasks); CJ Price et al. 1996 (when performing semantic judgment tasks); Henkin & Levy 2001 (in response to pleasant odors)	
Greater in females	**NORTH AMERICA** *United States*: Shucard et al. 1981:93 (3-month olds, when presented with verbal and nonverbal stimuli)					**NORTH AMERICA** *Canada*: Chipman et al. 2002 (young, during the control of hand movements); *United States*: Safer 1981(face recognition tasks); Shucard et al. 1984 (young, auditory evoked response); Reite et al. 1993 (college, posterior); Grabowski et al. 2003 (inferotemporal cortex, when naming visual objects)	**EUROPE** *Germany*: Hagemann et al. 1999:556 (alpha brain waves)

2.3.3.6. Hemispheric Transfer of Event-Related Potential

Two studies found that females more rapidly transferred ERP impulses from one hemisphere to the other when compared to males (Table 2.3.3.6).

Table 2.3.3.6. Hemispheric transfer of event-related potential.

Nature of Any Difference	Postpubertal
	Adult
Males more rapid	
No signif. difference	
Females more rapid	**EUROPE** *Poland*: Nowicks & Fersten 2001 (from left to right hemisphere) **NORTH AMERICA** *United States*: Geffen et al. 2000

2.3.3.7. Right Hemispheric Lateralization in Facial Recognition Tasks

According to two studies of monkeys, the right hemisphere was more active than the left in males than in females when both were performing facial recognition tasks (Table 2.3.3.7).

Table 2.3.3.7. Right hemispheric lateralization in facial recognition tasks.

Nature of Any Difference	Multiple Age Categories
More in males	
No signif. difference	
More in females	**PRIMATE (EXCEPT APE)** *Rhesus Macaques*: Vermeire & Hamilton 1998; Vermeire et al. 1998

2.3.3.8. Right Hemispheric Lateralization in Identifying Emotional Expressions

Numerous studies have compared the two hemispheres as they perform tasks requiring that they decode emotional expressions of others (or images of others). Most of these studies have found that the right hemisphere is more active in identifying facial emotional expressions among females than among males, especially following the onset of puberty (Table 2.3.3.8).

Table 2.3.3.8. Right hemispheric lateralization in identifying emotional expressions.

Nature of Any Difference	Prepubertal		Postpubertal	
	Early Childhood	Childhood	Adolescent	Adult
More in males		**NORTH AMERICA** *United States*: Staffieri & Basset 1970*		**NORTH AMERICA** *United States*: Coleman 1949; Fields 1953; Vinacke & Fong 1955; Buck 1976
No signif. difference	**NORTH AMERICA** *United States*: Kellogg & Eagleson 1931*; Gitter et al. 1971*	**NORTH AMERICA** *United States*: Gates 1923; Allport 1924; Staffieri & Basset 1970*; Gitter et al. 1971*	**NORTH AMERICA** *United States*: Buck 1976*	**NORTH AMERICA** *United States*: Fernberger 1927; Guilford 1929; Buck 1976*; Frijda 1953
More in females		**NORTH AMERICA** *United States*: Kellogg & Eagleson 1931*; Rosenthal et al. 1979*	**NORTH AMERICA** *United States*: Kellogg & Eagleson 1931*; Dickey & Knower 1941; Rosenthal et al. 1979* (face & gesture)	**NORTH AMERICA** *United States*: Buzby 1924; Hunt 1928; Moss 1929; Kanner 1931; Jennes 1932a; Carmichael et al. 1937 (gesture); Dusenbury & Knower 1938; Coleman 1949; Vinacke 1949; Weisgerber 1956 (face & gesture); N Levy & Schlosberg 1960; Zaidel & Mehrabian 1969 (face & gesture); Izard 1971; Gitter et al. 1972a; Gitter et al. 1972b; Gitter, Kozel, & Mostofsky 1972 (face & gesture); Buck et al. 1974; Zuckerman et al. 1975 (face & gesture); Buck 1976; Sweeney & Cottle 1976 (face & gesture); Zuckerman et al. 1976; Rosenthal et al. 1979* (face & gesture); Ladavas et al. 1980 (young); Safer 1981 (young); Strauss & Moscovitch 1981 (young); LA Burton & Levy 1989 (young) **OCEANIA** *New Guinea:* Ekman & Friesen 1971

2.3.3.9. Association Between Left-Hemispheric Damage and Language Disorders

Several studies have sought to determine if the sexes differ with regard to how the extent of damage specific to the brain's left-hemisphere is associated with subsequent language difficulties. As shown in Table 2.3.3.9, all of the studies have concluded that males suffer more in language capabilities following left hemispheric brain damage than do females.

Table 2.3.3.9. Association between left-hemispheric damage and language disorders.

Nature of Any Difference					Postpubertal	
						Adult
Greater among males						**EUROPE** *Italy*: Basso et al. 1982 (among asphasia patients) **NORTH AMERICA** *United States*: S Edwards et al. 1976 (among dysphasia patients); Messerli et al. 1976 (among asphasia patients); Inglis et al. 1982 (among brain-damaged patients); D Kimura & Harshman 1984
No signif. difference						
Greater among females						

2.3.4. Functional Subcortical Asymmetry

The neocortex has two obvious hemispheres, but less well known is the fact that nearly all components of the subcortex also come in pairs, with one on the left half and the other on the right half of the brain. Research that has compared males and females regarding the degree of asymmetry in the functioning of these various subcortical components is reviewed in the following subsection.

2.3.4.1. Asymmetry in Subcortical Brain Activation in General

With regard to subcortical regions of the brain, two studies were located pertaining to possible sex differences in laterality. One indicated that males exhibit more asymmetry in the left hippocampus than did females when engaged in spatial reasoning tasks. The other study found that females exhibited more asymmetry of the bilateral caudate body, left putamen, and left parahippocampal gyrus when dealing with unpleasant language (Table 2.3.4.1).

Table 2.3.4.1. Asymmetry in subcortical brain activation in general.

Nature of Any Difference					Postpubertal	
						Adult
Greater among males						**NORTH AMERICA** *United States*: Gron et al. 2000 (activation of the left hippocampus more during spatial reasoning)
No signif. difference						
Greater among females						**ASIA** *Japan*: Shirao et al. 2005:329 (bilateral caudate body, left putamen, and left parahippocampal gyrus, when dealing with unpleasant language)

2.3.4.2. Left Amygdala Activation

Two studies of amygdala activation during emotion-laden memory indicate that males activate the left amygdala more than do females (Table 2.3.4.2).

Table 2.3.4.2. Left amygdala activation.

Nature of Any Difference					Postpubertal	
						Adult
Greater in males						**NORTH AMERICA** *United States*: Canli et al. 2002 (when encoding emotional stimuli into memory); Cahill et al. 2004 (when encoding emotional stimuli into memory)
No signif. difference						
Greater in females						

2.3.4.3. Right Amygdala Activation

The same couple of studies cited in the table above indicated that the brain wave patterns being emitted by each of the two amygdali of females, relative to males, activate the right amygdala more than the left during emotion-laden memory tasks (Table 2.3.4.3).

Table 2.3.4.3. Right amygdala activation.

Nature of Any Difference					Postpubertal	
						Adult
Greater in males						
No signif. difference						
Greater in females						**NORTH AMERICA** *United States*: Canli et al. 2002 (when encoding emotional stimuli into memory); Cahill et al. 2004 (when encoding emotional stimuli into memory)

2.4

NEUROCHEMICAL FACTORS

The chemistry of the brain is exceedingly complex. However, in the present context it may be noted that most neurochemical activity is inferred from measuring neurochemical byproducts outside the brain. Consequently, the following section is brief even though many more general biochemical factors that often operate in the brain are covered in some of the subsequent sections.

2.4.1. Metabolic Activity in the Brain

Metabolic brain activity is concerned with chemicals that undergo some change as a result of brain functioning. The findings concerning sex differences in such activity are summarized in the following tables.

2.4.1.1. Metabolism in the Brain in General

Glucose is a naturally produced sugar essential for brain functioning to occur. The rate at which the brain metabolizes glucose is used to estimate the amount of activity that is occurring in various parts of the brain.

Sex differences have been found in glucose metabolism in various parts of the brain, but these differences vary by brain region and possibly by age (Table 2.4.1.1). For example, one study found glucose metabolism to be significantly higher for males in the temporal limbic region and the cerebellum while it was higher for females in the cingulate gyrus region. Another study reported that the thalamus was more active among young adult females while the same region was more active among elderly males.

Table 2.4.1.1. Metabolism in the brain in general.

Nature of Any Dif-ference					Postpubertal	
						Adult
Males had higher rates						**ASIA** *Japan:* Kawachi et al. 2002 (glucose, PET scan in the rt. insula temporal gyrus & medial frontal lobe)* **NORTH AMERICA** *United States*: Gur et al. 1995 (glucose, temporal-limbic/cerebellum)*; Haier & Benbow 1995 (glucose, temporal lobes during math reasoning); DGM Murphy et al. 1996 (glucose, thalamus, elderly)
No signif. difference						
Females had higher rates						**ASIA** *Japan:* Kawachi et al. 2002:80 (glucose, PET scans of hypothalamus)* **NORTH AMERICA** *United States*: Gur et al. 1995 (glucose, cingulate region, resting state)*; DGM Murphy et al. 1996 (glucose, thalamus)

2.4.1.2. Metabolic Brain Asymmetry

According to the one available study, females exhibit more asymmetry in metabolic brain processes than do males (Table 2.4.1.2).

Table 2.4.1.2. Metabolic brain asymmetry.

Nature of Any Dif-ference					Postpubertal	
						Adult
Males more						
No signif. difference						
Females more						**ASIA** *Japan:* Kawachi et al. 2002:82 (glucose metabolism)

2.4.1.3. Cerebral Blood Flow

Several studies have measured the amount of blood flowing throughout the brain when subjects engaged in various types of intellectual tasks such as memorizing lists of words or adding numbers. The amount of blood flow is thought to reflect the degree to which subjects must struggle with a particular cognitive task.

Table 2.4.1.3 shows that most studies have found females exhibiting greater blood flow under a variety of conditions than do males among both adolescents and adults. Exceptions have come from studying the elderly, among whom no significant gender differences were identified. Also, one study involved asking subjects to imagine acts of violence and found males exhibiting more cerebral blood flow in the visual cortex than was true for females.

Table 2.4.1.3. Cerebral blood flow.

Nature of . Any Difference					Postpubertal		Multiple Age Categories
						Adult	
Males exhibit more						**NORTH AMERICA** *United States*: Pietrini et al. 2000:1778 (in the visual cortex when imagining violence)	
No signif. difference						**NORTH AMERICA** *United States*: Melamed et al. 1980 (elderly); SM Davis et al. 1983 (elderly); Hannay et al. 1983; JS Meyer & Shaw 1984 (elderly)*; TG Shaw et al. 1984 (elderly)*	
Females exhibit more						**NORTH AMERICA** *United States*: TG Shaw et al. 1979; Gur et al. 1982; SM Davis et al. 1983; JS Meyer & Shaw 1984*; TG Shaw et al. 1994*; Esposito et al. 1996	**EUROPE** *Germany*: Gundling et al. 1985 **NORTH AMERICA** *United States*: G Rodriguez et al. 1988; Esposito et al. 1996

2.5

HORMONES

Hormones are biochemicals produced in one part of the body that have their main effects elsewhere in the body. Most hormones can be roughly subsumed under two categories: sex hormones and stress hormones. Note that any sex differences in the actual organs involved in producing hormones are covered in Chapter 1.

2.5.1. Sex Hormones

Sex hormones are those that have important roles to play in sexual differentiation during one or more phases of life. The most common and physically active sex hormones are estrogen and testosterone.

2.5.1.1. Steroids in General, Levels of

The steroids are a large family of hormones ultimately derived from cholesterol. They exert a wide variety of effects. General steroid levels are higher in females than males (Table 2.5.1.1), although there are examples of steroids that are higher in males (see the remainder of this section).

Table 2.5.1.1. Steroids in general, levels of.

Nature of Any Difference					Postpubertal		
						Adult	
More in males							
No signif. difference							
More in females						**RODENT** *Rat*: Pedersen 1988 (steroid output)	

2.5.1.2. Androgens in General

The term *androgen* is used to refer to all of the so-called male sex hormones. Therefore, it is not surprising to find that males have higher levels of androgens than do females, as indicated by one study shown in Table 2.5.1.2.

Table 2.5.1.2. Androgens in general.

Nature of Any Difference	Prepubertal		Postpubertal	
	Infant	Childhood	Adolescent	Adult
Higher in males	**RODENT** *Rat*: MJ Baum et al. 1991* (embryonic days 18-19)		**MARSUPIAL** *Gray Short Tailed Opossum*: Fadem & Harden 1992* (in plasma)	**NORTH AMERICA** *United States*: Darby & Childs 1941
No signif. difference	**PRIMATE (EXCEPT APE)** *Rhesus Macaque*: Sholl & Kim 1990 (embryonic day 70, in the amygdala & mediobasal hypothalamus) **RODENT** *Rat*: MJ Baum et al. 1991* (embryonic days 16-17 & 20-21)	**MARSUPIAL** *Gray Short Tailed Opossum*: Fadem & Harden 1992* (in plasma)		
Higher in females				

2.5.1.3. Androstenedione

Androstenedione is an androgen and is part of the biosynthetic pathway to testosterone, and therefore to estrogen. This hormone is produced in both the adrenal gland and the gonad. In those studies reporting a difference, female hyenas have higher levels of androstenedione (Table 2.5.1.3). It is worth noting that hyenas are the only mammalian species in which females have penises.

Table 2.5.1.3. Androstenedione.

Nature of Any Difference	Postpubertal	Multiple Age Categories
	Adult	
More in males		
No signif. difference	**ASIA** *Japan*: Takeuchi & Tsutsumi 2002 (women were in mid-follicular phase) **CANINE** *Spotted Hyena*: Goymann et al. 2001 (young)	**CANINE** *Spotted Hyena*: Racey & Skinner 1979; Lindeque et al. 1986
More in females		**CANINE** *Spotted Hyena*: Glickman et al. 1987; Glickman et al. 1992; Van Jaarsveld & Skinner 1991a

2.5.1.4. Dehydroepiandrosterone

Dehydroepiandrosterone (DHEA) and DHEA-sulfate (DHEAS) are closely related androgens produced in the adrenal glands and are precursors to testosterone. As shown in Table 2.5.1.4, these hormones appear to be more prevalent in males than in females.

Table 2.5.1.4. Dehydroepiandrosterone.

Nature of Any Difference	Postpubertal	Multiple Age Categories
	Adult	
Higher in males	**ASIA** *Japan*: Takeuchi & Tsutsumi 2002 (females in mid-follicular phase) **EUROPE** *Sweden*: Yamaji 1966 (young) **NORTH AMERICA** *United States*: Zumoff et al. 1980; Zumoff & Bradlow 1980	**NORTH AMERICA** *United States*: Orentreich et al. 1984:554
No signif. difference		
Higher in females		

2.5.1.5. Dihydrotestosterone

Dihydrotestosterone (DHT) is a metabolite of testosterone. It functions primarily to masculinize the reproductive system in males, although it also may have some masculinizing effects on the brain. As shown in Table 2.5.1.5, research findings have been inconsistent regarding gender differences although in some species including humans, the conclusion that dihydrotestosterone levels are higher in males than in females is supported.

Table 2.5.1.5. Dihydrotestosterone.

Nature of Any Difference	Postpubertal
	Adult
More in males	**EUROPE** *Germany*: Maras et al. 2003:936 **AMPHIBIAN** *Rough Skinned Newt*: FL Moore et al. 2000 (in plasma) **CANINE** *Spotted Hyena*: Goymann et al. 2001 (young)
No signif. difference	**RODENT** *Mouse*: Melcangi et al. 1987* (in the white matter of the hypothalamus & neocortex); *Rat*: Melcangi et al. 1987* (in the white matter of the hypothalamus & neocortex)
More in females	

2.5.1.6. Estrogen

Estrogen is widely thought of as a "female hormone", although it is also found in males in lower quantities, especially following the onset of puberty. The main hormone responsible for masculinizing the brain of mammals (including humans) perinatally is a form of estrogen (called *estradiol*) although both testosterone and dihydrotestosterone may also have masculinizing functions in some species or in some parts of the brain. Thus, it can be misleading to characterize sex hormones as either "male" or "female".

All of the evidence among postpubertal humans and animals indicates that females have higher levels of estrogen than do males (Table 2.5.1.6). For prepubertal animals, on the other hand, either no significant sex differences were found or higher estrogen levels were reported for males than for females.

Table 2.5.1.6. Estrogen.

Nature of Any Difference	Prepubertal	Postpubertal		Multiple Age Categories
	Infant	Adolescent	Adult	
Higher in males	**RODENT** *Rat*: SK Amateau et al. 2004* (2 hrs postnatal, in the frontal cortex, the hypothalamus)			
No signif. difference	**RODENT** *Rat*: SK Amateau et al. 2004* (2 hrs postnatal, in the cerebellum, the hippocampus, the preoptic area, the brain stem (postnatal day 1, in the frontal cortex, the preoptic area, the cerebellum, hippocampus, the brain stem)			
Higher in females		**EUROPE** *Britain*: Halari et al. 2005:107 (young) **NORTH AMERICA** *United States*: Ambrosius et al. 1998:244 (estradiol) **BIRD** *Phalarope*: Fivizzani et al. 1986; *Sandpiper*: Rissman & Wingfield 1984	**ASIA** *Japan*: Takeuchi & Tsutsumi 2002 (females in mid-follicular phase) **NORTH AMERICA** *United States*: Janowsky et al. 1998:426 (estradiol) **AMPHIBIAN** *Rough Skinned Newt*: FL Moore et al. 2000 (17 beta-estradiol in plasma) **RODENT** *Rat*: Whalen & Massicci 1975 (in the nucleus of the hypothalamic cells)	**NORTH AMERICA** *United States*: Darby & Childs 1941; LJ Martin et al. 2002:16 (Mexican Americans) **RODENT** *Rat*: Plaff & Keimer 1973

2.5.1.7. Folicular Stimulating Hormone

Follicular stimulating hormone (FSH) is a hormone produced by the pituitary gland (located directly beneath the brain). Along with lutenizing hormone (discussed below), FSH is instrumental in instructing the gonads of both sexes to produce other types of hormones (such as testosterone and estrogen). As shown in Table 2.5.1.7, one study of sex differences in humans indicated that males had higher levels of FSH than did females while two other studies found the opposite. One study of rodents found females levels to be higher. Since FSH levels change dramatically over the menstrual cycle, it is possible that sometimes men have higher levels and sometimes females do.

Table 2.5.1.7. Follicular stimulating hormone.

Nature of Any Difference	Prepubertal		Postpubertal
	Infant	Childhood	Adult
Higher in males			**EUROPE** *Britain*: Halari et al. 2005:107 (young)
No signif. difference			
Higher in females	**RODENT** *Rat*: ME Wilson & Handa 1997 (postnatal days 8-21, plasma)	**OCEANIA** *Australia*: CM Foster et al. 2004	**ASIA** *Japan*: Takeuchi & Tsutsumi 2002 (females in mid-follicular phase)

2.5.1.8. Gonadotrophin Hormone

The gonadotrophin hormone is produced in the hypothalamus and begins the process of producing other hormones in the adjacent pituitary gland. As shown in Table 2.5.1.8, one study of rats concluded that females produced more of this hormone than did males.

Table 2.5.1.8. Gonadotrophin hormone.

Nature of Any Difference						Postpubertal
						Adult
Higher in males						
No signif. difference						
Higher in females						**RODENT** *Rat*: Chowen-Breed et al. 1989 (in the hypothalamus)

2.5.1.9. Luteinizing Hormone

Luteinizing hormone (LH), along with follicular stimulating hormone (see above), is produced by the pituitary gland and serves to help regulate the production of sex hormones by the testes and ovaries. There appears to be no significant sex difference in the level of LH among human adults (Table 2.5.1.9).

Table 2.5.1.9. Luteinizing hormone.

Nature of Any Difference							Postpubertal
	Prenatal						Adult
Higher in males							
No significant difference							**ASIA** *Japan*: Takeuchi & Tsutsumi 2002 (women were in mid-follicular phase) **EUROPE** *Britain*: Halari et al. 2005:107 (young)
Higher in females	**RODENT** *Rat*: Slob et al. 1980 (just prior to birth, plasma levels)						

2.5.1.10. Progesterone

Progesterone is usually considered a “female hormone” reaching its highest levels during pregnancy. However the one available study among humans concluded that at least among young adults, no significant sex difference in progesterone levels was identifiable. For rats, female levels of progesterone were found to be higher (Table 2.5.1.10).

Table 2.5.1.10. Progesterone.

Nature of Any Difference						Postpubertal
						Adult
More in males						
No signif. difference						**EUROPE** *Britain*: Halari et al. 2005:107 (young)
More in females						**RODENT** *Rat*: RH Purday et al. 1990 (in the plasma & brain, radio immunoassay)

2.5.1.11. Testosterone

Testosterone is produced primarily in the male testes, although smaller quantities are also produced in the female ovaries and in the adrenal glands of both sexes. The measurement of testosterone levels is usually based on blood or saliva samples (Dabbs 1990; Halpern & Udry 1992).

Except for preadolescent children (among whom the evidence of gender differences is mixed), Table 2.5.1.11 shows that male levels of testosterone are significantly higher than female levels. Beyond puberty, gender differences in testosterone levels are substantial with males having 10- to 20-fold higher levels than they did in childhood (Faiman & Winter 1974; Knorr et al. 1974). Notably, a sex difference has been found even in the amniotic fluid prior to birth.

Table 2.5.1.11. Testosterone.

Nature of Any Difference	Prenatal	Prepubertal				Postpubertal		Multiple Age Categories
		Infant	Toddler		Childhood	Adolescent	Adult	
Higher in males	**EUROPE** *England*: Lutchmaya et al. 2002 (2nd trimester) **NORTH AMERICA** *Canada*: Grimshaw et al. 1995:93; *United States*: Gurpide et al. 1966 (gestation weeks 8-20); Abramovich & Rowe 1973 (2nd trimester) **BIRD** *Green Anoles*: Lovern et al. 2001* (before hatching) **RODENT** *Rat*: Slob et al. 1980 (in plasma); LM Smith et al. 2003:372; Houtsmuller et al. 1995 (embryonic day 19)	**NORTH AMERICA** *United States*: Forest et al. 1974 (7 months olds); Winter et al. 1976; Bidlingnaier et al. 1983 (~7 months old) **RODENT** *Rat*: Slob et al. 1980	**BIRD** *Green Anoles*: Lovern et al. 2001* (38 days after hatching)		**EUROPE** *Slovokia*: Ostatnikove et al. 2000:49* (average IQ subjects)	**EUROPE** *Germany*: Maras et al. 2003:936 **NORTH AMERICA** *United States*: Ambrosius et al. 1988:244; A Booth et al. 2003:91* (saliva); Granger et al. 2003:440 (circulating testosterone) **BIRD** *Sandpiper*: Ressman & Wingfield 1984	**ASIA** *China:* Yie et al. 1990; *Japan*: Takeuchi & Tsutsumi 2002 (females in mid-follicular phase; free and total testosterone) **EUROPE** *Britain*: Halari et al. 2005:107 (young) **NORTH AMERICA** *Canada*: Chio & Silverman 2002:118 (college); *United States*: SK Cunningham & McKenna 1988; Dabbs 1991:816 (college); TJ Allen et al. 1996:660; Greendale et al. 1997 (elderly); Janowsky et al. 1998:426 (free testosterone); Rosenblitt et al. 2001 (college); Shirtcliff et al. 2002:165 (college); Cohan et al. 2003:33 **AMPHIBIAN** *Rough Skinned Newt*: FL Moore et al. 2000 (in plasma) **CANINE** *Spotted Hyena*: Frank et al. 1985; Glickman et al. 1992; Goymann et al. 2001 (young) **PRIMATE (EXCEPT APE)** *Bonobo*: A Sannen et al. 2003 (testosterone metabolites); *Chimpanzee*: A Sannen et al. 2003 (testosterone metabolites)	**NORTH AMERICA** *United States*: LJ Martin et al. 2002:16 (Mexican-American) **RODENT** *Mouse*: Schuurs & Verheul 1990 **CANINE** *Spotted Hyena*: Glickman et al. 1987; Van Jaarsveld & Skinner 1991a
No signif. difference		**BIRD** *Green Anoles*: Lovern et al. 2001* (at hatching)			**EUROPE** *Slovokia*: Ostatnikove et al. 2000:49* (high IQ subjects) **NORTH AMERICA** *United States*: A Booth et al. 2003:91* (saliva)			**CANINE** *Spotted Hyena*: Racey & Skinner 1979; Van Jaarsveld & Skinner 1991b
Higher in females					**EUROPE** *Netherlands*: Cohen-Bendahan et al. 2004:915 **NORTH AMERICA** *United States*: Granger et al. 1999			

2.5.2. Stress Hormones (and Peptides)

Stress hormones are those that are released primarily under conditions of physical and emotional stress. Findings concerning gender differences in the release of a stress hormone, except in response to specific stimuli (discussed in Chapter 7), are presented below.

2.5.2.1. Corticosterone

Corticosterone is a major stress hormone secreted by the outer layer of the adrenal gland, most often in response to stress. As shown in Table 2.5.2.1, most studies of rodents have found higher levels of corticosterone in females than in males.

Table 2.5.2.1. Corticosterone.

Nature of Any Difference	Prepubertal	Postpubertal	Multiple Age Categories
	Childhood	Adult	
Greater in males			
No signif. difference		**RODENT** *Rats*: Park et al. 2003 (levels in unstressed, non-handled animals)	
Greater in females	**RODENT** *Rat*: Critchlow et al. 1963 (output)	**RODENT** *Mouse*: Halberg & Haus 1960 (young, adrenal output); Akinci & Johnston 1997*; Gaillard & Spinedi 1998; *Rat*: Critchlow et al. 1963 (young, adrenal output); Dohlgren et al. 2001:E332; MA Wilson et al. 2004 (after tested on a plus maze, after defensive prod burying task)	**RODENT** *Rat*: Kitay 1963 (output); JL Dunn et al. 1972 (output)

2.5.2.2. Corticotropin Releasing Hormone

Corticotropin releasing hormone (CRH) is produced by the hypothalamus and serves to stimulate the pituitary gland to release andrenocorticotropin hormone. The available research on CRH is limited to rats, and indicates that the amount produced by females exceeds that produced by males (Table 2.5.2.2).

Table 2.5.2.2. Corticotropin releasing hormone.

Nature of Any Difference	Postpubertal
	Adult
Males have more	
No signif. difference	
Females have more	**RODENT** *Rat*: Funabashi 2003 (Wistar strain, number of corticotropin-releasing hormone containing neurons in the preoptic area and in the bed nucleus of the stria terminalis, immunocytochemistry)

2.5.2.3. Cortisol

Cortisol is a stress hormone produced by the adrenal glands and is usually measured in the blood or in saliva. As shown in Table 2.5.2.3, studies have reached very inconsistent conclusions with regard to gender differences in cortisol levels.

Table 2.5.2.3. Cortisol.

Nature of Any Difference	Prepubertal		Postpubertal	Multiple Age Categories
	Infant	Early Childhood	Adult	
Higher in males	**UNGULATE** *Pig:* NL Gallagher et al. 2002:116 (neonate)	**NORTH AMERICA** *United States*: Tout et al. 1998* (with externalizing behavior)	**NORTH AMERICA** *United States*: Zumoff et al. 1974; Schoneshofer & Wagner 1977; Susman et al. 1997; R Andrew et al. 1998 (excreted in urine); Litchfield et al. 1998 (excreted in urine); R Andrew et al. 2000; Shamim et al. 2000 (excreted in urine); Masi et al. 2004* (elderly, excreted in urine uncorrected for creatinine excretions)	**EUROPE** *England*: EJ Lamb et al. 1997
No signif. difference			**EUROPE** *Italy*: Sgoifo et al. 2003:184 (saliva); *Netherlands*: Stalk et al. 1996:314 (elderly); *Sweden*: G Johasson & Post 1974 **NORTH AMERICA** *United States*: IR Bell et al. 1993 (elderly); Rosenblitt et al. 2001 (college, saliva); Masi et al. 2004* (elderly, excreted in urine corrected for creatinine excretions)	
Higher in females		**NORTH AMERICA** *United States*: Tout et al. 1998* (with internalizing behavior)	**EUROPE** *Britain*: Wright & Steptoe 2005 (elderly, tested in early morning) **NORTH AMERICA** *United States*: Peskind et al. 1996 (elderly); Storey et al. 2000:87	

2.5.2.4. Epinephrine (Adrenaline)

Epinephrine (adrenaline) is both a hormone and a neurotransmitter. High levels of epinephrine in the body are usually associated with stress. Most studies of sex differences in epinephrine levels that were located found it to be higher among males than for females, especially regarding humans and in terms of levels excreted in the urine (Table 2.5.2.4).

Table 2.5.2.4. Epinephrine (adrenaline).

Nature of Any Difference					Postpubertal		
						Adult	
Higher in males						**EUROPE** *Denmark*: AM Hansen et al. 2001 (excreted in the urine corrected for creatinine excretions) **NORTH AMERICA** *United States*: Souza et al. 1988 (excreted in the urine); Gerlo et al. 1991 (excreted in the urine); Gonzalez-Trapaga et al. 2000* (Whites, plasma levels); Reuben et al. 2000 (elderly, excreted in the urine corrected for creatinine excretions); Masi et al. 2004 (elderly, muscle mass controlled)	
No signif. difference						**NORTH AMERICA** *United States*: Gonzalez-Trapaga et al. 2000* (Blacks, plasma levels)	
Higher in females						**CHIROPTERAN** *Bat*: Ortega-Corona et al. 1992 (in the brain as a whole, 4 tropical species) **RODENT** *Rat*: Zukowska-Grojec et al. 1991 (plasma levels at rest)	

2.5.2.5. Neuropeptide Y

Neuropeptide Y (NPY) is a short protein most often associated with feeding behavior. However, it is likely to have many other functions that simply have not been well characterized yet. NPY is present in the plasma as well as in the brain. Its distribution in the brain is broad and is reflected in its ability to affect a broad spectrum of processes. In the plasma of rodents, there appears to be no sexual dimorphism (Table 2.5.2.5). In the arcuate region of the brain, males seem to have more NPY-expressing neurons, but there is no difference in the amount of NPY in each neuron.

Table 2.5.2.5. Neuropeptide Y.

Nature of Any Difference					Postpubertal		
						Adult	
Males have more						**RODENT** *Rat*: Urban et al. 1993 (Sprague-Dawley; number of NPY neurons in the arcuate nucleus)	
No signif. difference						**RODENT** *Rat*: Zukowska-Grojec et al. 1991 (plasma levels); Urban et al. 1993 (Sprague-Dawley; amount of NPY mRNA in arcuate neurons)	
Females have more							

2.5.3. Hormones (and Peptides) Other Than Sex or Stress Hormones

A variety of hormones do not easily fit into either sex hormone or stress hormone categories. Findings regarding sex differences in these hormones along with peptides are summarized below.

2.5.3.1. Arginine Vasopressin

Arginine vasopression (AVP), also known as an antidiuretic hormone (ADH), is a peptide hormone produced in the hypothalamus. It acts to promote the body's water re-absorption. It also plays a role in the modulation of behavior including aggression. As shown in Table 2.5.3.1, not all studies have been consistent, but they tend to suggest that AVP is not significantly sexually dimorphic.

Table 2.5.3.1. Arginine vasopressin.

Nature of Any Difference					Postpubertal		
						Adult	
Males have more						**RODENT** *Rat*: Planas et al. 1995 (number of mRNA-expressing neurons in the bed nucleus of the stria terminalis)	
No signif. difference						**EUROPE** *Netherlands*: Fliers et al. 1986 (immunoreactivity in the brain) **RODENT** *Rat*: Chen et al. 1997 (release from the ventral septal area)	
Females have more							

2.5.3.2. Galanin

Galanin is a neuropeptide with a fairly broad distribution throughout the brain. Sex differences in galanin appear to be brain-region and species-specific (Table 2.5.3.1). One consistent sex difference is that galanin and gonadotropin-releasing hormone are in the same neurons more often found in females than in males.

Table 2.5.3.2. Galanin.

Nature of Any Difference						Postpubertal
						Adult
Males have more						**RODENT** *Mouse*: Mathieson et al. 2000:260* (B6 & D2 strains, number of immunoreactive cells in the bed nucleus of the stria termianlis); *Rat*: Planas et al. 1995* (number of immunoreactive cells and number of galanin neurons containing vasopressin in the medial division of the bed nucleus of the stria terminalis); Polston & Simerly 2003 (in the AVPV fibers)
No signif. difference						**RODENT** *Mouse*: Mathieson et al. 2000:260* (B6 strain, number of immunoreactive cells in the MPA); *Rat*: Planas et al. 1995* (number of immunoreactive cells in the bed nucleus of the stria terminalis; number of galanin neurons and number of galanin neurons expressing vasopressin in the lateral division of the bed nucleus of the stria terminalis)
Females have more						**RODENT** *Mouse*: Mathieson et al. 2000:260* (D2 strain, number of immunoreactive cells in the MPA); *Rat*: Gabriel et al. 1989 (amount of galanin in the median eminence, neurointermediary lobe, anterior pituitary); Liposits et al. 1995 (colocalization of gonadotropin releasing hormone and galanin in the median eminence); Finn et al. 1996 (colocalization of gonadotropin releasing hormone and galanin)

2.5.3.3. Growth Hormone

As its name implies, the growth hormone (in humans, called the human growth hormone) plays an important role in stimulating the growth spurt following the onset of puberty. One study of rodents indicated that males had higher levels of growth hormone than did females (Table 2.5.3.3).

Table 2.5.3.3. Growth hormone.

Nature of Any Difference	Prepubertal					
				Childhood		
Males have more				**RODENT** *Mouse*: Nurhidayat et al. 2001 (ICR mice, number of immunoreactive cells in the arcuate nucleus); *Rats*: ER Brown et al. 1991 (in the pituitary)		
No signif. difference						
Females have more						

2.5.3.4. Growth Hormone Releasing Hormone

The growth hormone releasing hormone (GHRH) is produced in the mammalian hypothalamus to help trigger the production of growth hormone. According to one study of rats, male levels of GHRH are higher than those for females in several regions of the hypothalamus at various times in infancy (Table 2.5.3.4).

Table 2.5.3.4. Growth hormone releasing hormone.

Nature of Any Difference	Prepubertal					
	Infant					
Males have more	**RODENT** *Rats*: Chowen et al. 1996* (postnatal days 10 & 75, in the arcuate nucleus, the ventromedial, & the perinentricular nucleus of the hypothalamus)					
No signif. difference	**RODENT** *Rats*: Chowen et al. 1996* (postnatal days 25 & 35, in the arculate nucleus, ventromedial, & the perinentricular nucleus of the hypothalamus)					
Females have more						

2.5.3.5. Oxytocin

Oxytocin is an evolutionarily ancient neuropeptide hormone best known for its stimulatory role in lactation and parturition. This hormone is present in the mammalian brain where it helps to regulate a variety of behaviors, including maternal behavior, aggression, and pair bonding. As shown in Table 2.5.3.5, strain differences appear to exist with respect to any sex differences in the hypothalamus of rodents.

Table 2.5.3.5. Oxytocin.

Nature of Any Difference						Postpubertal
						Adult
Males higher						
No signif. difference						**AMPHEBIAN** *Chameleon*: Bennis et al. 1995 (immunoreactivity in the whole brain) **RODENT** *Mouse*: Mathieson et al. 2000:216* (D2 strain, number of immunoreactive cells in the medial preoptic area); *Prairie vole*: Lim et al. 2004 (immunoreactivity in nucleus accumbens)
Females higher						**RODENT** *Mouse*: Mathieson et al. 2000:216* (B6 strain, number of immunoreactive cells in the medial preoptic area)

2.5.3.6. Prolactin

Prolactin is a hormone so named because it was found to be associated with the production of breast milk in mammals. As shown in Table 2.5.3.6, the available studies of mammals have generally concluded that prolactin levels are greater among females than among males, while the one available study of birds found the opposite pattern.

Table 2.5.3.6. Prolactin.

Nature of Any Difference					Postpubertal
					Adult
Greater for males					**BIRD** *Sandpiper*: Oring et al. 1986 (young)
No signif. difference					**ASIA** *Japan*: Takeuchi & Tsutsumi 2002 (women were in mid-follicular phase)
Greater for females					**EUROPE** *England*: GM Goodwin & Cowen 1987 **NORTH AMERICA** *United States*: Storey et al. 2000:87 (expectant couples) **RODENT** *Rats*: Samuels & Bridges 1983 (young, virgins); DeVito 1988 (immunoreactive in the neocortex, in the median eminence, in the septum, the thalamus, the dorsal & ventral hypothalamus, the hippocampus, the cerebellum, the amygdala, the olfactory bulbs, & the pons-medulla area); Fernandez-Ruiz et al. 1992 (in the hypothalamus & anterior pituitary)

2.5.3.7. Somatostatin

Somatostatin is a hormone produced in the hypothalamus that inhibits the secretion of hormones produced outside of the brain, including somatotropin, insulin, and gastrin. As shown in Table 2.5.3.7, the extent to which somatostatin is sexually dimorphic appears to depend somewhat on age and brain region, at least among rats.

Table 2.5.3.7. Somatostatin.

Nature of Any Difference					Postpubertal	Multiple Age Categories
					Adult	
Greater for males					**RODENT** *Mouse*: Nurhidayat et al. 2001 (ICR mice; number of immunoreactive cells in the periventricular nucleus of the hypothalamus); *Rat*: Chower-Breed et al. 1989 (in the perinentricular nucleus of the hypothalamus)	**RODENT** *Rat*: Chower-Breed et al. 1989* (postnatal days 10, 25, 35, & 75, in the perinentricular nucleus of the hypothalamus)
No signif. difference					**RODENT** *Rat*: Chower-Breed et al. 1989* (in the frontal cortex)	
Greater for females						

2.5.3.8. Vasopressin

Vasopressin has been shown to play a role in social behavior in many species, ranging from fish to humans. In the brain, it is thought to act through one of two neuronal receptors (the V1a receptor and the V1b receptor). Among other things, vasopressin may help to activate the hypothalamic-pituitary-adrenal axis during stress. Table 2.5.3.8 shows that studies have reached mixed conclusions concerning gender differences in vasopressin levels.

Table 2.5.3.8. Vasopressin.

Nature of Any Difference					Postpubertal
					Adult
Higher in males					**EUROPE** *Netherlands*: Swaab & Hofman 1984 (in the suprachiasmatic nucleus) **RODENT** *Prairie Vole*: Lonstein et al. 2005* (mRNA in the bed nucleus of the stria terminalis; in the hebenula, inferred from immunocytochemistry; in the lateral septum, inferred from immunocytochemistry); *Rat*: DeVries et al. 1981 (SCN neurons containing vasopressin); DeVries et al. 1983 (fibers in the septum) **UNGULATE** *Sheep*: Canny et al. 1999 (arginine vasopressin)
No signif. difference					**AMPHEBIAN** *Chameleon*: Bennis et al. 1995 (immunoreactivity in the whole brain) **RODENT** *Mouse*: Mathieson et al. 2000:261* (D2 & B6 strain, bnumber of immunoreactive cells in the medial preoptic area, D2 strain; bed nucleus of the stria terminalis; D2 & B6 strains, number of immunoreactive neurons in the bed nucleus of the stria terminalis; D2 strain, in the medial preoptic area, number of immunoreactive cells); *Prairie Vole*: Lonstein et al. 2005* (in the medial amygdala mRNA); Lim et al. 2004 (immunoreactive fibers in ventral pallidum)
Higher in females					**RODENT** *Mouse*: Mathieson et al. 2000:261* (B6 strain; number of immunoreactive cells in the medial preoptic area)

2.6

HORMONE, PEPTIDE, AND NEUROTRANSMITTER RECEPTORS AND RECEPTOR BINDING

In order for most hormones, peptides, and neurotransmitters to have their biological influences, they must lock into a protein receptor site specifically designed for that particular biochemical. This section pertains to sex differences in such receptor sites.

2.6.1. Sex Hormone Receptors

Hormone receptors are located within cellular cytoplasm, as well as in the blood stream. They must be present in a cell for any particular hormone to exercise its effects on that cell, although there may also be some other direct effects of hormones on neuronal electrical activity.

2.6.1.1. Androgen Receptors

The number of androgen receptors varies greatly among brain regions and tissues in the body. These receptors are thought to alter the expression of various genes rather than affect the electrical activity of cells directly. Androgen receptors mediate the effects of androgen molecules on a broad array of behavioral and cognitive processes.

2.6.1.1a. Androgen Receptors outside the Nervous System

One study in frogs found that, muscle tissue of males had more androgen receptors than was true for females (Table 2.6.1.1a).

Table 2.6.1.1a. Androgen receptors outside the nervous system.

Nature of Any Difference						Multiple Age Categories
Males have more						**AMPHIBIAN** *Frog*: Segil et al. 1987 (muscle tissue)
No signif. difference						
Females have more						

2.6.1.1b. Androgen Receptors in the Neocortex

According to Table 2.6.1.1b, among rat neonates, at least some portions of the neocortex in males may contain neurons within more androgen receptors than is true for corresponding neurons in the females. However, other portions of the rat neonatal brain appear to exhibit no gender difference in neocortical androgen receptors.

Table 2.6.1.1b. Androgen receptors in the neocortex.

Nature of Any Difference	Prepubertal					
	Infant					
Males have more	**RODENT** *Rat*: Nunez et al. 2003* (expression in primary visual cortex on postnatal day 10)					
No signif. difference	**RODENT** *Rat*: Nunez et al. 2003* (expression in the anterior cingulate & frontal cortex at postnatal days 0, 4, & 10; in primary visual cortex on postnatal days 0 & 4)					
Females have more						

2.6.1.1c. Androgen Receptors in the Subcortex Other Than the Hypothalamus and the Substantia Nigra

Thus far, bird and rodent studies have all found that regions of the brain other than the hypothalamus and substantia nigra exhibit greater numbers of androgen receptors in males than in females. However, in the case of one study of humans, the opposite pattern was found in one subcortical region (Table 2.6.1.1c).

Table 2.6.1.1c. Androgen receptor in the subcortex other than the hypothalamus and the substantia nigra.

Nature of Any Difference	Postpubertal
	Adult
More in males	**BIRD** *Zebra Finch*: Arnold & Saltiel 1979 (binding in high vocal control center); Nordeen et al. 1986 (binding in high vocal control center) **RODENT** *Mouse*: Shah et al. 2004 (transgenic mouse, in the bed nucleus of the straia terminalis, androgen receptor gene expression using reporter gene); *Rat*: Xiao and Jordon 2002 (Blue-Spruce Long-Evans strain, in the hippocampus, number of immunoreactive cells in CA1 regions and lateralization of androgen receptors in the CA1)
No signif. difference	
More in females	**EUROPE** *Netherlands*: Ishunina et al. 2002 (percentage containing androgen receptor in the vertical limb of the diagonal band of Broca and the nucleus basalis of Meynert)

2.6.1.1d. Androgen Receptors in the Hypothalamus

Studies of androgen receptors in various portions of the hypothalamus have, for the most part, concluded that these receptors exist in greater numbers in males than in females (Table 2.6.1.1d).

Table 2.6.1.1d. Androgen receptors in the hypothalamus.

Nature of Any Difference	Postpubertal
	Adult
More in males	**EUROPE** *Netherlands*: Fernandiz-Guasti et al. 2000* (stronger immunoreactivity in the lateromammillary nucleus and medial mammillary nucleus); Kruijver et al. 2001 (stronger immunoreactivity) **AMPHIBIAN** *Whiptail lizard*: J Godwin et al. 2000 (mRNA in the medial preoptic area) **RODENT** *Rat*: Shah et al. 2004 (transgenic mouse, in the preoptic area, androgen receptor gene expression using reporter gene)
No signif. difference	**EUROPE** *Netherlands*: Fernandiz-Guasti et al. 2000* (stronger immunoreactivity in the bed nucleus of the stria terminalis, the nucleus basalis of Meynart, the island of Calleja)
More in females	

2.6.1.1e. Androgen Receptors in the Substantia Nigra

The substantia nigra is a major site of dopamine production in the brain, helping to control coordinated movement. Mixed results have been found regarding gender differences in the number of androgen receptors in the substantia nigra, at least among rats (Table 2.6.1.1e).

Table 2.6.1.1e. Androgen receptors in the substantia nigra.

Nature of Any Difference	Prepubertal	Postpubertal	
	Infant	Adolescecent	Adult
More in males	**RODENT** *Rat*: Ravizza et al. 2002* (Sprague-Dawley strain, immunocytochemistry, pars reticulata PN5; immunocytochemistry, pars compacta PN0)	**RODENT** *Rat*: Ravizza et al. 2002* (Sprague-Dawley strain, immunocytochemistry, pars reticulata PN15; immunocytochemistry, pars compacta PN15)	**RODENT** *Rat*: Ravizza et al. 2002* (Sprague-Dawley strain, immunocytochemistry, pars reticulata PN30)
No signif. difference	**RODENT** *Rat*: Ravizza et al. 2002* (Sprague-Dawley strain, immunocytochemistry, pars compacta PN1, PN5)		**RODENT** *Rat*: Ravizza et al. 2002* (Sprague-Dawley strain, immunocytochemistry, pars compacta PN30)
More in females	**RODENT** *Rat*: Ravizza et al. 2002* (Sprague-Dawley strain, immunocytochemistry, pars reticulata PN0, PN1)		

2.6.1.1f. Androgen Receptors in the Mamillary Body

The mamillary body is a midbrain structure comprised of several sub-nuclei. Research suggests that this structure is important for male sexual behavior, but not female sexual behavior. More androgen receptors seem to be expressed in males than in females within this region of the brain (Table 2.6.1.1f).

Table 2.6.1.1f. Androgen receptors in the mamillary body.

Nature of Any Difference	Postpubertal
	Adult
More in males	**EUROPE** *Netherlands*: Kruijver et al. 2001 (intensity of androgen receptor immunoreactivity)
No signif. Difference	
More in females	

2.6.1.2. Estrogen Receptors

Estrogen receptors are necessary for estrogenic molecules to exert their biological effects. The two types of estrogen receptors identified so far are those known as alpha and beta estrogen receptors, which are known to operate under separate genetic controls. Because the findings of gender differences in estrogen receptors have varied greatly, depending in part on the specific region of the brain under study, four separate tables are presented.

2.6.1.2a. Estrogen Receptors in the Neocortex

The limited findings concerning estrogen receptors in the neocortex present a mixed picture regarding any sex differences in Broca's area (Table 2.6.1.2a). This portion of the neocortex helps to control most linguistic comprehension in humans.

Table 2.6.1.2a. Estrogen receptors in the neocortex.

Nature of Any Difference	Prepubertal	Postpubertal
	Infant	Adult
More in males		**EUROPE** *Netherlands*: Kruijver et al. 2003* (Broca's area, alpha & beta, nuclear staining after immunocytochemistry)
No signif. difference	**RODENT** *Rat*: Reddy et al. 1980 (postnatal day 6)	**EUROPE** *Netherlands*: Kruijver et al. 2003* (Broca's area, alpha, cytoplasmic staining after immunocytochemistry)
More in females		**EUROPE** *Netherlands*: Kruijver et al. 2003* (Broca's area, beta, cytoplasmic & fiber staining after immunocytochemistry)

2.6.1.2b. Estrogen Receptors in the Subcortex Other than the Hypothalamus and the Substantia Nigra

The subcortex consists of many structures, two of which have received a great deal of research attention and a complex set of findings. These two subcortical structures are the hypothalamus and substantia nigra; thus, they will be covered in separate tables. Regarding the remainder of the subcortex, the limited findings to date have provided a mixed picture with respect to any possible gender differences (Table 2.6.1.2b).

Table 2.6.1.2b. Estrogen receptors in the subcortex other than the hypothalamus and the substantia nigra.

Nature of Any Difference	Prepubertal	Postpubertal
	Infant	Adult
More in males		**EUROPE** *Netherlands*: Kruijver et al. 2003* (in the bed nucleus of the straia terminalis, alpha, nuclear and cytoplasmic staining after immunocytochemistry)
No signif. difference	**RODENT** *Rat*: Reddy et al. 1980 (postnatal day 6, in the pituitary)	**EUROPE** *Netherlands*: Kruijver et al. 2003* (in the caudal nucleus, alpha, nuclear & cytoplasmic staining after immunocytochemistry; in the lateral septim, alpha & beta, nuclear and cytoplasmic staining after immunocytochemistry) **MARSUPIAL** *Gray short tail opossum*: Handa et al. 1991 (binding in the medial amygdala & the arculate nucleus) **RODENT** *Rat*: Weiland et al. 1997 (immuno labeled cells in the hippocampus)
More in females		**EUROPE** *Netherlands*: Kruijver et al. 2003* (in the caudate nucleus, cytoplasmic and fiber staining after immunocytochemistry; in the bed nucleus of the straia terminalis, beta, cytoplasmic staining after immunocytochemistry)

2.6.1.2c. Estrogen Receptors Throughout the Hypothalamus

The hypothalamus is a small but structurally intricate portion of the mammalian subcortex. In various ways, it helps to regulate body homeostasis as well as the synthesis and release of most hormones produced by the body. As one can see from viewing Table 2.6.1.2c, it is difficult to generalize about sex differences in the number of estrogen receptors throughout the hypothalamus.

Table 2.6.1.2c. Estrogen receptors throughout the hypothalamus.

Nature of Any Difference	Prepubertal	Postpubertal
	Infant	Adult
More in males		**EUROPE** *Netherlands:* Ishunina et al. 2002* (supraoptic nucleus, percentage of vasopressin neurons containing estrogen receptor beta immunoreactivity in the nucleus); Kruijver et al. 2003* (in the medial preoptic area, alpha, nuclear staining after immunocytochemistry; beta, cytoplasmic staining after immunocytochemistry; in the sexually dimorphic nucleus of the preoptic area, alpha & beta, staining after immunocytochemistry; ventromedial nucleus, staining after immunocytochemistry) **RODENT** *Mouse*: Kudwa et al., 2004* (transgenic mouse, in the medial preoptic area, beta, immunocytochemistry)
No signif. difference	**RODENT** *Rat*: Reddy et al. 1980 (postnatal day 6)	**EUROPE** *Netherlands:* Ishunina et al. 2002* (supraoptic nucleus, percentage of vasopressin neurons containing estrogen receptor alpha immunoreactivity in the cytoplasm, the percentage of vasopressin neurons containing no estrogen receptor alpha, percentage of vasopressin neurons containing no estrogen receptor beta); Kruijver et al. 2003* (in the medial preoptic area, alpha, cytoplasmic staining after immunocytochemistry, alpha & beta, nuclear staining after immunocytochemistry; in the sexually dimorphic nucleus of the preoptic area, alpha & beta, cytoplasmic staining after immunocytochemistry; ventromedial mucleus, cytoplasmic staining after immunocytochemistry) **MARSUPIAL** *Gray short tail opossum*: Handa et al. 1991 (binding in the ventro medial hypothalamus, preoptic periventricular area) **RODENT** *Mouse*: Kudwa et al., 2004* (transgenic mouse, in the medial preoptic area, alpha, immunocytochemistry)
More in females		**EUROPE** *Netherlands*: Kruijver et al. 2003* (in the paraventricular nucleus of the hypothalamus, beta, nuclear staining after immunocytochemistry; suprachiasmatic nucleus of the hypothalamus, nuclear staining after immunocytochemistry; in the supraoptic nucleus of the hypothalamus, nuclear and cytoplasmic staining after immunocytochemistry)

2.6.1.2d. Estrogen Receptors in the Substantia Nigra

The substantia nigra can be divided into two regions: the pars reticulata and the pars compacta. As an important regulator of coordinated movement, degeneration of this structure is thought to be a key factor in Parkinson's disease.

Table 2.6.1.2d suggests that any gender differences in the number of estrogen receptors in the substantia nigra, at least in rats, depends on the type of estrogen receptor (alpha vs. beta), the specific region of the substantia nigra sampled, and possibly even the age of the animal.

Table 2.6.1.2d. Estrogen receptors in the substantia nigra.

Nature of Any Difference	Prepubertal	Postpubertal	
	Infant	Adolescent	Adult
More in males	**RODENT** *Rat*: Ravizza et al. 2002* (Sprague-Dawley strain, alpha, immunocytochemistry, pars reticulata PN0; beta, immunocytochemistry, pars reticulata PN0, PN5; beta, immunocytochemistry, pars compacta PN0, PN1, PN5)	**RODENT** *Rat*: Ravizza et al. 2002* (Sprague-Dawley strain, alpha, immunocytochemistry, pars reticulata PN15)	
No signif. difference	**RODENT** *Rat*: Ravizza et al. 2002* (Sprague-Dawley strain, alpha, immunocytochemistry, pars reticulata PN1, PN 5; alpha, immunocytochemistry, pars compacta PN5; beta, immunocytochemistry, pars reticulata PN0, PN5; beta, immunocytochemistry, pars compacta PN0, PN1, PN5)	**RODENT** *Rat*: Ravizza et al. 2002* (Sprague-Dawley strain, beta, immunocytochemistry, pars reticulata PN15; beta, immunocytochemistry, pars compacta PN15)	**RODENT** *Rat*: Ravizza et al. 2002* (Sprague-Dawley strain, alpha immunocytochemistry, pars compacta PN30; beta, immunocytochemistry, pars reticulata PN30)
More in females	**RODENT** *Rat*: Ravizza et al. 2002* (Sprague-Dawley strain, beta, immunocytochemistry, pars reticulata PN1)	**RODENT** *Rat*: Ravizza et al. 2002* (Sprague-Dawley strain, alpha, immunocytochemistry, pars compacta PN15)	**RODENT** *Rat*: Ravizza et al. 2002* (Sprague-Dawley strain, alpha, immunocytochemistry, pars reticulata PN30; beta, immunocytochemistry, pars compacta PN30)

2.6.1.3. Neuropeptide Y Receptors

Neuropeptide Y (NPY) receptors are members of the large G-protein coupled receptor (GPCR) family. There are at least five sub-types of NPY receptors. According to the one relevant study located, there are more of the Y1 receptor subtype in the neocortex of males, but the Y1 receptors have a higher binding affinity for NPY in females (Table 2.6.1.3)

Table 2.6.1.3. Neuropeptide Y receptors.

Nature of Any Difference	Postpubertal
	Adult
Males have more	**RODENT** *Rat*: MC Michel et al. 1995* (Y1 receptor number)
No signif. difference	
Females have more	**RODENT** *Rat*: MC Michel et al. 1995* (Y1 binding affinity in the neocortex)

2.6.1.4. Opioid Receptors

Based on a single study, Table 2.6.1.4 indicates that the sexes do not differ with respect to the prevalence of opioid receptor binding sites in the brain.

Table 2.6.1.4. Opioid receptors.

Nature of Any Difference	Postpubertal
	Adult
More in males	
No signif. difference	**RODENT** *Rat*: Kepler et al. 1991 (delta, mu1, & mu2 opioid binding in the neocortex and hypothalamus)
More in females	

2.6.1.5. Progesterone Receptors

According to Table 2.6.1.5, among one species of lizard, males exhibited a greater increase in progesterone receptors following exposure to testosterone than did females. Rats also exhibited similar results.

Table 2.6.1.5. Progesterone receptors.

Nature of Any Difference	Prepubertal	Postpubertal
	Infant	Adult
More in males	**RODENT** *Rat*: Kato et al. 1984 (neonate, hypothalamic preoptic area)	**AMPHIBIAN** *Whiptail lizard*: Godwin et al. 2000 (increase in mRNA expression in the ventromedial hypothalamus after testosterone treatment)
No signif. difference		
More in females		

2.6.2. Hormone, Peptide, and Neurotransmitter Receptors

Biochemical receptors help to facilitate the functioning of specific chemicals by providing a location onto which the chemicals can attach and thereby activate some type of functional change. Receptors (also termed binding sites) other than those for sex hormone are discussed below.

2.6.2.1. Benzodiazepine Receptors

Benzodiazepine molecules bind to a specific site on the $GABA_A$ receptor where they facilitate activation of the inhibitory action of GABA by increasing its affinity for the $GABA_A$ receptor. The benzodiazepine recpetor is especially important clinically because its activation is strongly anxiolytic. There does not appear to be a sex difference in rat benzodiazepine receptors (Table 1.6.2.1).

Table 2.6.2.1. Benzodiazepine receptors.

Nature of Any Difference	Postpubertal
	Adult
More in males	
No signif. difference	**RODENT** *Rat*: Farabollini et al. 1996 (number in the amygdala)
More in females	

2.6.2.2. 3H-Dihydroergocryptine Binding

Dihydroergocryptine is a drug with a complex pharmacology. It appears to bind alpha-adrenergic receptors but also has an affinity for some dopamine receptor sub-types. Any gender differences appear to be region specific (Table 2.6.2.2).

Table 2.6.2.2. 3H-Dihydroergocryptine binding.

Nature of Any Difference	Postpubertal
	Adult
More in males	**RODENT** *Rat*: Orensanz et al. 1982* (to alpha adrenergic receptors in the hypothalamus, hippocampus, & olfactory bulb)
No signif. difference	
More in females	**RODENT** *Hamster*: Koneyev & Cincotta, 1996 (affinity and beta-max in liver extract); *Rat*: Orensanz et al. 1982* (to alpha adrenergic receptors in the spinal cord & visual cortex)

2.6.2.3. Dopamine Receptors

Dopamine receptors (or binding sites) are located in many parts of the brain. Among humans, one study found that males had more of a specific type of dopamine receptors (called D2 receptors) in the left side of the brain than did females, but that no sex differences were evident in the corresponding right side. Among young rats, males also appear to have a greater density of D2 receptors than females in at least one brain region (Table 2.6.2.3).

Table 2.6.2.3. Dopamine receptors.

Nature of Any Difference	Prepubertal	Postpubertal		Multiple Age Categories
	Toddler	Adolescent	Adult	
More in males	**RODENT** *Rat*: SL Andersen & Teicher 2000 (postnatal days 25-40, striatal D2 density)		**EUROPE** *Finland*: Phjalainen et al. 1998* (D2 receptor affinity in the left striatum)	**RODENT** *Rat*: Jalilian-Tehrani et al. 1982* (postnatal days 20, 30, & adulthood, 3H-dopamine binding in the frontal cortex & amygdala)
No signif. difference		**RODENT** *Rat*: Harrod et al. 2004 (D1 & D2 receptors)	**EUROPE** *Finland*: Phjalainen et al. 1998* (D2 receptor affinity in the right striatum, enzymatic activity (beta max)	**RODENT** *Rat*: Jalilian-Tehrani et al. 1982* (postnatal days 20, 30, & adulthood, 3H-dopamine binding in the hypothalamus, thalamus, & brainstem)
More in females				

2.6.2.4. Dopamine Reuptake Receptor Sites

After its release from the presynaptic terminal, dopamine is taken back up into that nerve cell and reused. This is managed by a transporter protein called the dopamine reuptake receptor site. One study found that reuptake site to be more frequently found in male rodent stiatums (Table 2.6.2.4).

Table 2.6.2.4. Dopamine reuptake receptor sites.

Nature of Any Difference	Postpubertal
	Adult
Greater in males	**RODENT** *Rat*: Morissette & DiPaolo 1993 (striatal sites in dopamine neurons)
No signif. difference	
Greater in females	

2.6.2.5. GABA Receptors

The findings surrounding GABA receptors in the brain are limited to rodents, and their patterns thus far do not seem to warrant generalization with respect to the nature of sex differences (Table 2.6.2.5).

Table 2.6.2.5. GABA receptors.

Nature of Any Difference	Postpubertal	
	Adolescent	Adult
Males have more		**RODENT** *Mouse*: Akinci & Johnston 1997* (GABA_A receptor binding in forebrain, gonadectomized, not under stress); *Rat*: Juptner & Hiemke 1990* (in vitro GABA_A receptor binding in the preoptic area of the hypothalamus & the mediobasal hypothalamus)
No signif. difference		**RODENT** *Rat*: Bujas et al. 1997 (GABA_A muscimol binding affinity in the neocortex, the cerebellum); Juptner & Hiemke 1990* (in vitro GABA_A receptor binding in the neocortex and the corticomedial amygdale)
Females have more	**RODENT** *Rat*: Farabollini et al. 1996 (in the forebrain)	**RODENT** *Mouse*: Akinci & Johnston 1997* (GABA_A receptor binding in forebrain, gonadectomized, under stress)

2.6.2.6. Glucocorticoid Receptors

One study of glucocorticoid receptors found their numbers to be greater among females than among males in humans (Table 2.6.2.6).

Table 2.6.2.6. Glucocorticoid receptors.

Nature of Any Difference	Postpubertal
	Adolescent
Males have more	
No signif. Difference	
Females have more	**NORTH AMERICA** *United States*: Aljubeh et al. 2001:1644

2.6.2.7. Histamine Receptors

According to one study of rats, females have greater numbers of histamine binding sites in the neocortex than do males as both approach adulthood, although earlier in development, no significant sex difference was found (Table 2.6.2.7).

Table 2.6.2.7. Histamine receptors.

Nature of Any Difference	Multiple Age Categories
Males have more	
No signif. Difference	**RODENT** *Rat*: Ghi et al. 1991 (postnatal day 10 through 36, in the neocortex)
Females have more	**RODENT** *Rat*: Ghi et al. 1991 (postnatal day 37 to adulthood, in the neocortex)

2.6.2.8. Interleukin Receptors

Interleukins are proteins produced by the body that serve to enhance the immune system. There are six known interleukins. As with many other biochemicals, interleukins act as they bind to specific receptor sites. As shown in Table 2.6.2.8, one study found no significant sex differences in one type of interleukin receptors in any of the brain areas investigated.

Table 2.6.2.8. Interleukin receptors.

Nature of Any Difference	Postpubertal
	Adult
Males have more	
No signif. difference	**RODENT** *Rat*: Gayle et al. 1997 (interleukin-1 mRNA expression in the neocortex, the hypothalamus, the hippocampus, the cerebellum, & the brainstem)
Females have more	

2.6.2.9. Norepinephrine Reuptake Receptor Sites

After its release from the presynaptic terminal, norepinephrine is taken back up into the presynaptic terminal. This occurs via a transporter protein sometimes termed the norepinephrine reuptake receptor. Based on limited information, it appears that females have more reuptake receptors in the frontal cortex than males (Table 2.6.2.9).

Table 2.6.2.9. Norepinephrine reuptake receptor sites.

Nature of Any Difference	Postpubertal
	Adult
Greater in males	
No signif. difference	
Greater in females	**RODENT** *Rat*: Vathy et al. 1997 (in the frontal cortex)

2.6.2.10. Oxytocin Receptors

According to minimal research with hamsters, the distribution of oxytocin receptors (or binding sites) exhibited no sexual dimorphism (Table 2.6.2.10).

Table 2.6.2.10. Oxytocin receptors.

Nature of Any Difference	Postpubertal
	Adult
Greater in males	
No signif. difference	**RODENT** *Hamster*: Dubois-Dauphin et al. 1992 (in the cingulate cortex, the islands of calleja, the amygdala, dorsal hippocampus, the dorsal motor nucleus of the vagus nerve, lateral septum, medial hypothalamus, & the endopiriform nucleus); *Prairie Vole*: Lim et al. 2004 (binding in nucleus accumbens, binding in caudate-putamen, and binding in olfactory tubercle)
Greater in females	

2.6.2.11. Effects of Photoperiod on Oxytocin Receptors

According to one study, alterations in the photoperiod had the same effects on the distribution of oxytocin binding sites throughout the brain among males as among females (Table 2.6.2.11).

Table 2.6.2.11. Effects of photoperiod on oxytocin receptors.

Nature of Any Difference	Postpubertal
	Adult
Greater among males	
No signif. difference	**RODENT** *Hamster*: Dubois-Dauphin et al. 1992
Greater among females	

2.6.2.12. Serotonin Receptors

Serotonin is a major neurotransmitter. The findings to date concerning sex differences in the number of serotonin receptors (or binding sites) in the brain seem to be conflicting, although the precise regions of the brain sampled and the species involved may be responsible for the apparent inconsistencies (Table 2.6.2.12). Additionally, there are at least eleven different serotonin receptors. The distribution and/or amount of some, but not all, serotonin may ultimately prove to be sexually dimorphic.

Table 2.6.2.12. Serotonin receptors.

Nature of Any Difference	Postpubertal	Multiple Age Categories
	Adult	
Males have more	**RODENT** *Rat*: Fischette et al. 1983; Zhang et al. 1999* (5-HT1a mRNA in the hypothalamus and amygdale, and 5-HT2a receptor mRNA in ventromedial nucleus of the hypothalamus)	**NORTH AMERICA** *United States:* Biver et al. 1996 (5-HT2 receptors)
No signif. difference	**NORTH AMERICA** *United States*: Arango et al. 2001 (5-HT1a receptor in the dorsal and medial raphe nuclei) **RODENT** *Rat*: Jalilian-Tehrani et al. 1982 (3H binding sites in the prefrontal cortex, the amygdala, hypothalamus, thalamus, & brain stem); Zhang et al. 1999* (5-HT2a receptor mRNA in most brain regions, and distribution of 5-HT1a binding and mRNA in cortex, dorsal raphe, inferior colliculus, thalamus)	
Females have more	**PRIMATE (EXCEPT APE)** *Macaques:* SN Young & Ervin 1984 **RODENT** *Rat*: Simerly et al. 1984 (in the preoptic area); Zhang et al. 1999* (5-HT1a mRNA in the hippocampus, and 5-HT2a mRNA & 5-HT2a binding in the hippocampus)	**NORTH AMERICA** *United States:* SN Young et al. 1980

2.6.2.13. Vasopressin Receptors

There are at least three types of receptors for vasopressin at various locations in the body. Table 2.6.2.13 suggests that males have more vasopressin receptors in some areas of the body than do females, while in most areas, there are no significant gender differences.

Table 2.6.2.13. Vasopressin receptors.

Nature of Any Difference					Postpubertal
					Adult
Greater among males					**EUROPE** *Netherlands:* Elands et al. 1990* (receptor density in the peripheral mononuclear blood cells) **RODENT** *Hamster*: Dubois-Dauphin et al. 1991* (premammillary nucleus of the hypothalamus)
No signif. difference					**EUROPE** *Netherlands:* Elands et al. 1990* (receptor affinity in the peripheral mononuclear blood cells) **RODENT** *Hamster*: Dubois-Dauphin et al. 1991* (ventromedial & medial tuberal nuclei of the hypothalamus); *Prairie Vole*: Lim et al. 2004 (binding in ventral pallidum, binding lateral septum, and binding in endopiriform nucleus); *Rat*: Szot et al. 1994 (Long-Evans, in situ hybridization, frontal cortex, piriform cortex, anterior olfactory nucleus, suprachiasmatic nucleus, CA1, CA2, CA3 dentate gyrus of the hippocampus, paraventricular nucleus, ventromedial nucleus of the hypothalamus, arcuate nucleus, cerebellum, and lateral habenular nucleus)
Greater among females					

2.6.2.14. Neuronal Receptor Elimination/Loss/Pruning During Development

One study of rats indicated that more of a major type of dopamine receptors is lost during development among males than among females (Table 2.4.2.14).

Table 2.6.2.14. Neuronal receptor elimination/loss/pruning during development.

Nature of Any Difference					Postpubertal
					Adult
More in males					**RODENT** *Rat*: SA Andersen & Teicher 2000 (D2 receptors in striatum)
No signif. difference					
More in females					

2.7
NEUROCHEMISTRY

Neurochemistry has to do with the chemistry of the brain and the spinal cord. The studies reviewed below have sought to identify gender differences in the prevalence of numerous neurochemicals both in humans and in other animals.

2.7.1. Neurotransmitters and Neuropeptides

Neurotransmitters are chemicals that aid in the transmission of impulses between neurons. Neuropeptides are fairly simple protein-like molecules that can often function in the brain as neurotransmitters.

2.7.1.1. Acetylcholine

One study of a frog species concluded that acetylcholine was released from innervated muscle fibers more by females than by males (Table 2.7.1.1).

Table 2.7.1.1. Acetylcholine.

Nature of Any Difference					Postpubertal
					Adult
More in males					
No signif. difference					
More in females					**AMPHIBIAN** *African Clawed Frog*: Tobias et al. 1995 (released from neurons innervating the laryngeal muscle fibers)

2.7.1.2. Dopamine

Dopamine is a major neurotransmitter and is classified as one of the catecholamines (along with epinephrine and norepinephrine).

2.7.1.2a. Dopamine Levels

Findings surrounding sex differences in dopamine levels have been extremely mixed. This is probably at least partly due to the different body location samples and the species involved. Two studies of human cadavers reached somewhat different conclusions regarding gender differences in the level of dopamine in the brain. One study found male levels to be higher whereas the other found no significant difference (Table 2.7.1.2a). Studies of live human subjects also reached contrary conclusions. In the case of rats, inconsistent sex differences were also found, but these differences may be due to the areas of the brain examined.

Table 2.7.1.2a. Dopamine levels.

Nature of Any Difference					Postpubertal		Multiple Age Categories
						Adult	
Higher in males						**NORTH AMERICA** *United States*: Gerlo et al. 1991 (excreted in the urine) **RODENT** *Bat*: Ortega-Corona et al. 1992 (4 tropical species); *Rat*: Crowley et al. 1978 (in the caudate, tractus diagonalis, arcuate, median eminence, & striatum); Wilson & Agrawal 1979 (in the midbrain)	**NORTH AMERICA** *United States*: Konradi et al. 1992 (in the whole brain of cadavers)
No signif. difference						**RODENT** *Mouse*: BC Lee et al. 2001 (in the striatum); *Rat*: Carlsson & Carlsson 1988 (in the neocortex, limbic forebrain, striatum, hypothalamic preoptic area, brainstem); Dluzen et al. 2003 (basal levels in the striatum)	**NORTH AMERICA** *United States*: Adolfsson et al. 1979 (in the whole brain of cadavers)
Higher in females						**EUROPE** *Finland*: Kaasinen et al. 2001 **RODENT** *Rat*: Simerly et al. 1985 (in the anteroventricular periventricular nucleus; Sprague-Dawley); Dorce & Palermo-Neto 1994 (in the striatum)	

2.7.1.2b. Change in Dopamine With Age

According to one study of rats, males exhibit a greater decrease in dopamine levels with age than do females, although another study found no significant sex difference (Table 2.7.1.2b).

Table 2.7.1.2b. Change in dopamine with age.

Nature of Any Difference							Multiple Age Categories
Males decrease more							**RODENT** *Rat*: Dorce & Palermo-Neto 1994 (from ages 3 months to 23 months, in the striatum)
No signif. difference							**RODENT** *Rat*: WA Cass et al. 2005 (covering ages 4, 14, & 24 months, in the striatum)
Females decrease more							

2.7.1.2c. Dopamine Release, Basal

There appears to be no global sex difference in basal dopamine release. However, as shown in Table 2.7.1.2c, sex differences have been reported in some species under some circumstances. The sex differences that do exist are likely to be species and region specific.

Table 2.7.1.2c. Dopamine release, basal.

Nature of Any Difference					Postpubertal		
						Adult	
More in males						**RODENT** *Mouse*: MCDermott et al. 1994 (potassium stimulated from striatum slices)	
No signif. difference						**RODENT** *Mouse*: Bhatt & Dluzen 2005 (CD-1 strain, from striatum); *Rat*: Xiao & Becker 1994 (striatum using microdialysis)	
More in females						**RODENT** *Rat*: Walker et al. 1999 (Sprague Dawley strain, from striatum)	

2.7.1.2d. Dopamine Transporter

The dopamine transporter helps recycle dopamine by returning dopamine that has been released into the synapse to the neuron that released it. The dopamine transporter is the target of drugs such as cocaine and Ritalin. As shown in Table 2.7.1.2d, seemingly inconsistent findings with respect to sex differences in dopamine transporter function have been identified.

Table 2.7.1.2d. Dopamine transporter.

Nature of Any Difference	Postpubertal
	Adult
More in males	**RODENT** *Mouse*: Bhatt & Dluzen 2005 (DAT function; CD-1 strain)
No signif. difference	**RODENT** *Rat*: Walker et al. 1999* (affinity of DAT for dopamine; Sprague Dawley)
More in females	**RODENT** *Rat*: Rivest et al. 1995 (DAT density and beta-max); Walker et al. 1999* (dopamine uptake; Sprague Dawley)

2.7.1.3. Gamma-Aminobutyric Acid

Gamma-aminobutyric acid (GABA) is an amino acid that functions by inhibiting some nerve cell transmissions. The one study of sex differences in the prevalence of GABA concluded that females seems to have more than males.

Table 2.7.1.3. Gamma-aminobutyric acid.

Nature of Any Difference	Postpubertal
	Adult
More in males	
No signif. difference	
More in females	**NORTH AMERICA** *United States*: Epperson et al. 2005 (brain imaging technique)

2.7.1.4. Gonadotropin Releasing Hormone/Luteinizing Hormone Releasing Hormone

Gonadotropin releasing hormone (GnRH) and luteinizing hormone releasing hormone (LHRH) refer to the same hormone produced by the same ten amino acid neuropeptides. They are produced in a subset of neurons diffusely located in the hypothalamus. The distribution of GnRH neurons is species-specific. GnRH release underlies the activation of the entire reproductive system. As shown in Table 2.7.1.4, the sexes appear to be similar in the number and distribution of GnRH neurons, although there may be a few brain regions in which females exhibit more GnRH/LHRH than do males.

Table 2.7.1.4. Gonadotropin releasing hormone/luteinzing hormone releasing hormone.

Nature of Any Difference	Postpubertal	Multiple Age Categories
	Adult	
More in males		
No signif. difference	**EUROPE** *Britain*: Parker et al. 1980 (in the hypothalamus) **RODENT** *Rat*: Wray & Hoffman 1986* (number of GnRH-containing cells in the brain generally) **UNGULATE** *Sheep*: Wood et al. 1992 (number, distribution, morphology)	**RODENT** *Guinea pig*: Schanzel-Fukuda 1981 (immunocytochemistry of development)
More in females	**RODENT** *Rat*: Wray & Hoffman 1986* (number of GnRH-containing cells anterior to the organum vasculaosum lamina terminalis/preoptic area but nowhere else)	

2.7.1.5. Neurotensin

Neurotensin is a peptide whose function is still under investigation. It is known that the neurotensin system interacts with the dopamine system. Sexual dimorphisms in neurotensin appear to vary with brain region and fluctuate according to the phase of the estrus cycle (Table 2.7.1.5).

Table 2.7.1.5. Neurotensin.

Nature of Any Difference	Postpubertal
	Adult
More in males	**RODENT** *Rat*: Watson & Hoffman 1983 (neurotensin containing cells in the hypothalamic SDN-POA)
No signif. difference	**RODENT** *Rat*: Kinkead et al. 2000* (immunoreactivity in the caudate nucleus)
More in females	**RODENT** *Rat*: Kinkead et al. 2000* (mRNA in nucleus accumbens, caudate, and ventral tegmental area during some phases of the estrus cycle; immunoreactivity in the nucleus accumbens and ventral tegmental areas during some phases of the estrus cycle)

2.7.1.6. Norepinephrine Levels

Norepinephrine (NE) is one of the three neurotransmitters classified as catecholamines. However, it is also found outside the brain. In the brain, it is primarily synthesized in the locus coeruleus, which sends projections throughout the remainder of the brain. Norepinephrine is important for many aspects of neural function, including attention and arousal. Studies of humans indicate that males have higher NE levels than do females when exposed to any type of physical challenge. The findings among rodents seem to vary depending on the regions of the brain being sampled (Table 2.7.1.6).

Table 2.7.1.6. Norepinephrine levels.

Nature of Any Difference	Prepubertal	Postpubertal
	Infant	Adult
More in males		**EUROPE** *Finland*: Geelen et al. 2002* (elderly, in the plasma) **NORTH AMERICA** *United States*: Souza et al. 1988 (excreted in the urine); Gerlo et al. 1991 (excreted in the urine); Ng et al. 1993 (in the plasma levels during orthostatic stress); SR Barnett et al. 1999 (in the plasma levels during prolonged upright posture); Masi et al. 2004 (elderly, production with muscle mass controlled) **RODENT** *Bat*: Ortega-Corona et al. 1992 (4 tropical species); *Rat*: Crowley et al. 1978 (in the preoptic-suprachiasmatic, paraventricular, periventricular, arcuate, median eminence); Vicente-Torres & Gil-Loyzaga 2002* (cochlear levels after 24 months)
No signif. difference	**RODENT** *Rat*: Beaston-Wimmer & Smolen 1991* (postnatal day 1, in the superior cervical ganglion)	**EUROPE** *Finland*: Geelen et al. 2002* (middle-age, in the plasma) **RODENT** *Chinese Hamster*: JM Feldman & Gerritsen 1988* (with diabetes, in the neocortex, in the liver); *Rat*: Beaston-Wimmer & Smolen 1991* (in the superior cervical ganglion); Vicente-Torres & Gil-Loyzaga 2002* (cochlear levels at 3, 6, 9, 12, 19 months)
More in females	**RODENT** *Rat*: Beaston-Wimmer & Smolen 1991* (postnatal days 14, in the superior cervical ganglion)	**RODENT** *Chinese Hamster*: JM Feldman & Gerritsen 1988* (with diabetes, in the kidneys); *Rat*: Wilson & Agrawal 1979 (in the SDN-POA); *Rat*: Zukowska-Grojec et al. 1991 (plasma levels at rest)

2.7.1.7. Activity of Norepinephrine Neurons

Norepinephrine neuronal activity can be measured several different ways, including direct recording of the electrical activity of specific neurons. One study concluded that the electrical activity (firing rate) of norepinephrine neurons in the locus coeruleus is similar in both sexes (Table 2.7.1.7).

Table 2.7.1.7. Activity of norepinephrine neurons.

Nature of Any Difference	Postpubertal
	Adult
More in males	
No signif. difference	**RODENT** *Rat*: Klink at al. 2002 (firing rate of locus coeruleus neurons)
More in females	

2.7.1.8. Serotonin

As a major neurotransmitter, serotonin is usually associated with feelings of calm and tranquility. It is also involved in sensory perception and sexual function. Virtually all of the brain's serotonin is synthesized in a large cluster of midbrain neurons called the Raphe.

2.7.1.8a. Serotonin Levels

The levels of serotonin in the brain can be directly assessed only after removing the brain from a deceased animal. Therefore, the research on sex differences is confined thus far to nonhumans. These studies indicate that, at least in most parts of the rat brain, higher levels of serotonin are found in females compared to males (Table 2.7.1.8a).

Table 2.7.1.8a. Serotonin levels.

Nature of Any Difference					Postpubertal		Multiple Age Categories
						Adult	
Greater in males						**RODENT** *Rat*: Wilson & Agrawal 1979 (in the midbrain); Carlsson & Carlsson 1988*	
No signif. difference							
Greater in females						**RODENT** *Rat*: Rosencrans 1970 (brain as a whole); Kawakami et al. 1978 (in the raphe nucleus, the hypothalamus); AG Watts & Stanley 1984 (in the forebrain); Carlsson & Carlsson 1988* (in the limbic forebrain, the hypothalamus, the brainstem)	**RODENT** *Rat*: Haleem et al. 1990 (in the hypothalamus)

2.7.1.8b. Serotonin Synthesis

Two studies involving PET scans have inferred that in humans, the brains of males may be more active in synthesizing serotonin than are the brains of females (Table 2.7.1.8b).

Table 2.7.1.8b. Serotonin synthesis.

Nature of Any Difference					Postpubertal		
						Adult	
More in males						**NORTH AMERICA** *Canada:* Young et al. 1999 (synthesis rate measured by PET); Nishizawa et al. 1997 (synthesis rate measured by PET)	
No signif. difference							
More in females							

2.7.1.8c. Activity of Serotonin Neurons

Serotonergic neuronal activity can be measured several different ways, including direct recording of the electrical activity of a neuron. The electrical activity (firing rate) of serotonin neurons was found in one study of rats to be greater in males than in females (Table 2.7.1.8c).

Table 2.7.1.8c. Activity of serotonin neurons.

Nature of Any Difference					Postpubertal		
						Adult	
More in males						**RODENT** *Rat*: Klink at al. 2002 (firing rate of dorsal Raphe neurons)	
No signif. difference							
More in females							

2.7.1.8d. Serotonin Transporter

Serotonin is recycled after release. The serotonin transporter sequesters serotonin from the synapse and brings it back into the presynaptic terminal. The serotonin transporter is the target of serotonin specific reuptake inhibitor antidepressant drugs. One study of humans failed to reveal any significant gender difference in serotonin transportation (Table 2.7.1.8d).

Table 2.7.1.8d. Serotonin transporter.

Nature of Any Difference					Postpubertal		
						Adult	
More in males							
No signif. difference						**NORTH AMERICA** *United States*: Arango et al. 2001 (binding and mRNA in dorsal and medial Raphe nucleus)	
More in females							

2.7.1.9. Substance P

Substance P appears to play a role in blocking pleasurable sensations derived from consuming opiate drugs. Research pertaining to the presence of substance P in the brains of rats has concluded that any sex differences depend on the specific region examined and possibly on the age of the animals studied (Table 2.7.1.9).

Table 2.7.1.9. Substance P.

Nature of Any Difference	Prepubertal				Postpubertal		
				Childhood		Adult	
More in males				**RODENT** *Rat*: Coslovsky et al. 1985 (in the anterior pituitary); ER Brown et al. 1991 (immunoreactivity in the anterior pituitary)			
No signif. difference							
More in females						**RODENT** *Rat*: Polston & Simerly 2003 (in the PSTp & the MPNc)	

2.7.1.10. Vasotocin

Vasotocin is closely related chemically to vasopressin. It is more ancient than vasopressin and is present in more primitive (pre-mammalian) species. Its function appears similar to that of vasopressin. In one species, more vasotocin was identified in males than in females (Table 2.7.1.10).

Table 2.7.1.10. Vasotocin.

Nature of Any Difference					Postpubertal		
						Adult	
More in males						**AMPHIBIAN** *Rough Skinned Newt*: FL Moore et al. 2000 (immunoreactive cells in the nucleus amygdala dorso lateralis bed nucleus of straia terminalis, anterior preoptic area)	
No signif. difference							
More in females							

2.8
ENZYMES AND PEPTIDES THROUGHOUT THE BODY

Enzymes and peptides that are found throughout the body, rather than being almost exclusively located in the brain, are discussed below.

2.8.1. Enzymes

Enzymes are usually small, simple proteins that control chemical reactions in the body, functioning much like a catalyst. The way enzymes usually function is by attaching to other larger biochemicals, thereby causing it to form a new more complex biochemical.

2.8.1.1. 3,4-Dihydroxyphenylacetic Acid

3,4-dihydroxyphenylacetic acid (DOPAC) is a metabolite of dopamine when dopamine is broken down by monoamine oxidase. It is often used as an indirect marker of dopamine release. In mouse striatum, one study found the levels of DOPAC to be higher in males than in females (Table 2.8.1.1).

Table 2.8.1.1. 3,4-dihydroxyphenylacetic acid.

Nature of Any Difference					Postpubertal		
						Adult	
More in males						**RODENT** *Mouse*: Bhatt & Dluzen, 2005 (CD-1 strain, in vitro striatal tissue)	
No signif. difference							
More in females							

2.8.1.2. 5-Alpha Reductase

5-alpha reductase is responsible for converting testosterone into dihydrotestosterone. Most studies have failed to find any significant gender difference in the levels of this enzyme (Table 2.8.1.2).

Table 2.8.1.2. 5-alpha reductase.

Nature of Any Difference	Prenatal	Prepubertal	Postpubertal
		Infant	Adult
Higher in males			
No significant difference	**PRIMATE (EXCEPT APE)** *Rhesus Macaque*: Resko et al. 1988 (gestational days 50, 80, & 150, in the diencephalons, brainstem, & frontal & temporal cortex); Sholl & Kim 1990 (gestational day 70, in the mediobasal hypothalamus)	**RODENT** *Rat*: NA Jacobson et al. 1997 (enzymatic rate in the amygdala & cortex)	**AMPHIBIAN** *Green Anole Lizard*: GJ Rosen & Wade 2001 (in the whole brain during breeding season)
Higher in females			**BIRD** *Japanese Quail*: BA Schlinger & Callard 1987 (in the pituitary)

2.8.1.3. 5-Beta Reductase

5-beta reductase is an enzyme that functions within the brain of many animal species. One study of birds concluded that the sexes were statistically equivalent in the levels of this enzyme (Table 2.8.1.3).

Table 2.8.1.3. 5-beta reductase.

Nature of Any Difference	Prepubertal
	Infant
Greater in males	
No significant difference	**BIRD** *Zebra Finch*: J Wade et al. 1995 (in the telencephalic & diencephalic cell cultures)
Greater in females	

2.8.1.4. 5-Hydroxytryptophan Decarboxylase

5-Hydroxytryptophan decarboxylase is the enzyme that converts l-hydroxy-tryptophan to serotonin. It also converts l-tryptophan to tryptamine. Both steps are important for the synthesis of serotonin. As shown in Table 2.8.1.4 females appear to have more neurons that express this enzyme than do males, at least among rats.

Table 2.8.1.4. 5-Hydroxytryptophan decarboxylase.

Nature of Any Difference	Prenatal	Prepubertal	Postpubertal
		Infant	Adult
Higher in males			
No significant difference			
Higher in females	**RODENT** *Rat*: Balan et al. 2000 (Wistar rats; number and size of neurons and intensity of immunoreactivity; embryonic day 20)	**RODENT** *Rat*: Balan et al. 2000 (Wistar rats; number and size of neurons and intensity of immunoreactivity; postnatal day 9)	**RODENT** *Rat*: Vaccasi et al. 1977 (in the neocortex)

2.8.1.5. Acetylcholinesterase

Acetylcholinesterase is ubiquitous in the brain. It breaks down the neurotransmitter acetylcholine. Acetycholinesterase immunocytochemistry is often used to help map the brain. In the limited number of studies analyzed, there appears to be no sex difference in acetylcholinesterase in the brain (Table 2.8.1.5).

Table 2.8.1.5. Acetylcholinesterase.

Nature of Any Difference	Postpubertal
	Adult
Males have more	
No signif. difference	**RODENT** *Prairie Vole*: Lim et al. 2002 (staining in the nucleus accumbens, staining in the caudate-putamen, staining in the olfactory tubercle, staining in the ventral pallidum); *Rat*: Galani et al., 2002 (Long-Evans, histochemistry in cingulate cortex, piriform cortex, somatosensory cortex, retrosplenial cortex, perirhinal cortex, dorsal and ventral striatum, CA1 and dentate gyrus of the hippocampus, dorsal thalamus)
Females have more	

2.8.1.6. Adenylyl Cyclase Activity

Adenylyl cyclase is an enzyme found throughout the body. Its primary function appears to reside in the brain, where it aids in the production of cyclic adenosine monophosphate (cAMP), a neurochemical that has been implicated in many basic learning processes. Table 2.8.1.6 indicates that in certain regions of the subcortex, males may have greater adenylyl cyclase activity than females, while elsewhere in the subcortex, there is no significant sex difference.

Table 2.8.1.6. Adenylyl cyclase activity.

Nature of Any Difference	Postpubertal
	Adult
More in males	**EUROPE** *Italy*: Paleso et al., 2000:54* (basal and forskolin-induced activity in the raphe nucleus)
No signif. difference	**EUROPE** *Italy*: Paleso et al., 2000:54* (basal and forskolin-induced activity in the prefrontal cortex and hippocampus)
More in females	

2.8.1.7. Aromatase

Aromatase helps in the conversion of testosterone into estradiol. It appears to play a vital, but still not fully understood, role in sexual differentiation, especially of the brain (Ellis & Ames 1987). According to Table 2.8.1.7, most studies of aromatase activity have concluded that males exhibit higher levels than do females, even prior to birth.

Table 2.8.1.7. Aromatase.

Nature of Any Difference	Prenatal	Prepubertal		Postpubertal	Multiple Age Categories
		Infant	Toddler	Adult	
More in males	**MUSTELID** *Ferret*: Tobet et al. 1985* (5-8 days before birth, in the POA, & anterior & mediobasal hypothalamus) **PRIMATE (EXCEPT APE)** *Rhesus Macaque*: Sholl & Kim 1990 (embryonic day 70, in the medial basal hypothalamus & amygdala) **RODENT**; *Rat*: Beyer et al. 1993* (embryonic day 15 hypothalamus, activity in vitro)		**MARSUPIAL** *Short-Tailed Opossum*: B Fadem et al. 1993b* (activity in the POA, postnatal day 16)	**AMPHIBIAN** *Green Anole*: GJ Rosen & Wade 2001 (in the whole brain during breeding season) **BIRD** *Japanese Quail*: BA Schlinger & Callard 1987 (in the anterior hypothalamus, the POA, & the pituitary) **MARSUPIAL** *Short-Tailed Opossum*: B Fadem et al. 1993b* (activity in the POA) **UNGULATE** *Sheep*: Roselli et al 2004 (activity in the ovine sexually dimorphic nucleus); Roselli et al 2003 (mRNA in the ovine sexually dimorphic nucleus	
No significant difference	**RODENT** *Rat*: Beyer et al. 1993* (embryonic day 20 hypothalamus, activity in glia)	**MARSUPIAL** *Short-Tailed Opossum*: B Fadem et al. 1993b* (at birth, in the POA) **RODENT** *Rat*: NA Jacobson et al. 1997 (enzymatic rate in the amygdala & cortex)		**BIRD** *Zebra Finch*: J Wade et al. 1995 (in telencephalic or diencephalic cell cultures) **RODENT** *Rat*: Lavaque et al. 2006 (Wistar rat); mRNA in the cerebellum)	**MUSTELID** *Ferret*: Tobet et al. 1985* (postnatal days 7, 15, 30, & 51, in the POA, anterior & mediobasal hypothalamus, & neocortex) **RODENT** *Rat*: Lavaque et al. 2005 (Wistar rat; mRNA in the cerebellum on postnatal days 1, 15, 20, 30)
More in females				**ASIA** *Japan*: Murakami et al. 2003 (mRNA levels in the aorta) **FISH** *Lythrypnus Dalli*: Black et al. 2005 (brain aromotase activity)	

2.8.1.8. Cholinesterase (Cholesteryl Esters)

Cholinesterase is an enzyme that, along with acetylcholinesterase (see Table 2.8.1.5), assists in breaking down the neurotransmitter acetylcholine. Most of the available research suggests that the levels of this enzyme are greater in males than in females, at least among rats (Table 2.8.1.8).

Table 2.8.1.8. Cholinesterase (cholesteryl esters).

Nature of Any Difference	Postpubertal
	Adult
More in males	**RODENT** *Rat*: Trzeciak & Malendowicz 1981 (cholesteryl ester hydrolase activity); Kraemer et al. 2002* (neutral cholesteryl ester hydrolase activity)
No significant difference	
More in females	**RODENT** *Rat*: Kraemer et al. 2002* (amount of cholesteryl esters)

2.8.1.9. Cytochrome P450 Side Chain Cleavage Enzyme (P450SCC, CYP11A1)

Cytochrome P450 side chain cleavage, P450scc or CYP11A1 in humans, is the first and rate-limiting enzyme in steroid hormone synthesis. It cleaves the side chain to catalyse the conversion of cholesterol into pregnenolone. This enzyme is present at the highest levels in the gonad, adrenal gland, and brain. The available evidence has presented a mixed picture with respect to a possible sex difference in the activity of this enzyme (Table 2.8.1.9).

Table 2.8.1.9. Cytochrome P450 side chain cleavage enzyme (P450SCC, CYP11A1).

Nature of Any Difference	Postpubertal	Multiple Age Categories
	Adult	
Males have more		**RODENT** *Rat*: Lavaque et al. 2005* (mRNA in cerebellum on postnatal day 10)
No signif. difference	**EUROPE** *Germany*: Watzka et al. 1999 (mRNA in hippocampus & subcortical white matter of the temporal lobe) **RODENT** *Rat*: Lavaque et al. 2005* (mRNA in cerebellum)	**RODENT** *Rat*: Lavaque et al. 2005* (mRNA in cerebellum on postnatal days 1, 5, 15, 20, 30)
Females have more	**EUROPE** *Germany*: Watzka et al. 1999 (mRNA in temporal lobe cortex)	

2.8.1.10. Dopa Decarboxylase

Dopa decarboxylase is one of the enzymes in the biosynthetic pathway of dopamine and serotonin. Limited evidence suggests that sex differences in this enzyme appear to be species and brain-region specific (Table 2.8.1.10).

Table 2.8.1.10. Dopa decarboxylase.

Nature of Any Difference	Postpubertal
	Adult
More in males	**RODENT** *Mouse*: Bhatt & Dluzen, 2005 (CD-1 strain, in the striatum)
No signif. difference	
More in females	**RODENT** *Rat*: Vaccasi et al. 1977 (in the cerebellum & neocortex)

2.8.1.11. Glyceraldehyde 3-Phosphate Dehydrogenase

Glyceraldehyde 3-phosphate dehydrogenase is part of the metabolic pathway responsible for glycolysis, a metabolic process that produces energy for cellular functioning. This is a ubiquitous enzyme. One study reported that in the frontal cortex, men had higher levels of this enzyme than did females (Table 2.8.1.11).

Table 2.8.1.11. Glyceraldehyde 3-phosphate dehydrogenase.

Nature of Any Difference	Postpubertal
	Adult
Males more	**EUROPE** *Britain*: Preece & Cairns 2003 (mRNA in frontal cortex measured by real-time RT-PCR)
No signif. difference	
Females more	

2.8.1.12. Hydrolase Activity

Hydrolase is a class of enzymes that controls hydrolysis in the body or a reaction in which some chemical substance reacts with water. As shown in Table 2.8.1.12, the one available study reached various conclusions about sex differences in hydrolase activity, depending on the type of hydrolase and the part of the body examined.

Table 2.8.1.12. Hydrolase activity.

Nature of Any Difference	Prepubertal
	Infant
Greater in males	**RODENT** *Rat*: Zhang et al. 1996* (Hydrolase A in the liver)
No significant difference	**RODENT** *Rat*: Zhang et al. 1996* (Hydrolase A in the lungs & kidneys)
Greater in females	**RODENT** *Rat*: Zhang et al. 1996* (Hydrolase C in the liver)

2.8.1.13. Monoamine Oxidase (MAO) Activity

Monoamine oxidase (MAO) is found throughout the body. In the brain, MAO breaks down the catecholamine neurotransmitter substances, thus limiting their activity at those synapses within the nervous system.

As shown in Table 2.8.1.13, among humans, females appear to have more MAO activity than males, at least in the blood system where most samples of MAO are drawn. Among rats, on the other hand, one study found males exhibiting greater MAO activity than females.

Table 2.8.1.13. Monoamine oxidase (MAO) activity.

Nature of Any Difference	Postpubertal	Multiple Age Categories
	Adult	
Higher in males	**RODENT** *Rat*: Vaccasi et al. 1977 (in the neocortex)	
No signif. difference		
Higher in females	**EUROPE** *Sweden*: Fowler et al. 1982; Oreland 1993; AF Klinteberg 1996 **NORTH AMERICA** *United States*: TP Bridge et al. 1985	**EUROPE** *Estonia*: Mereakk et al. 2003:1509 (levels, adolescent and school age)

2.8.1.14. Neuron-Specific Enolase

Neuron-specific enolase (NSE) is part of the metabolic pathway involved in glycolysis. The NSE enzyme is commonly used as a marker to differentiate neurons from other cell types. According to one study, there is more NSE in the frontal cortex of males than of females (Table 2.8.1.14).

Table 2.8.1.14. Neuron-specific enolase.

Nature of Any Difference	Postpubertal
	Adult
Males more	**EUROPE** *Britain*: Preece & Cairns 2003 (mRNA in frontal cortex measured by real-time RT-PCR)
No signif. difference	
Females more	

2.8.1.15. Tyrosine Hydroxylase, Level of

Tyrosine hydroxylase is the rate-limiting enzyme in catecholamine synthesis. Thus, the amount of dopamine, norepinephrine, or epinephrine synthesized by a neuron is related to the amount of tyrosine hydroxylase present. The studies cited in Table 2.8.1.15 suggest that the evidence is mixed regarding the existence of any sex differences in tyrosine hydroxylase levels.

Table 2.8.1.15. Tyrosine hydroxylase, level of.

Nature of Any Difference	Prepubertal	Postpubertal
	Infant	Adult
More in males		**RODENT** *Rat*: Beaston-Wimmer & Smolen 1991* (in the superior cervical ganglion mRNA)
No signif. difference	**RODENT** *Rat*: Beaston-Wimmer & Smolen 1991* (postnatal day 1, in the superior cervical ganglion mRNA)	**RODENT** *Rat*: Beaston-Wimmer & Smolen 1991* (in the superior cervical ganglion neurons)
More in females	**RODENT** *Rat*: Beaston-Wimmer & Smolen 1991* (postnatal day 14, in the superior cervical ganglion mRNA)	**RODENT** *Rat*: Vaccasi et al. 1977 (in the cerebellum & the neocortex)

2.8.1.16. Tyrosine Hydroxylase Neurons, Number of

Tyrosine hydroxylase is the rate-limiting enzyme in catecholamine synthesis. As shown in Table 2.8.1.16, there appear to be sex differences in the number of neurons that express tyrosine hydroxylase. In some regions, such as the midbrain, males generally have more such cells, while in the anteroventral periventricular nucleus of the hypothalamus, females have more, at least among rats.

Table 2.8.1.16. Tyrosine hydroxylase neurons, number of.

Nature of Any Difference	Postpubertal
	Adult
Males have more	**RODENT** *Rat*: Simerly 1989* (suprachiasmatic nucleus); *Prairie Vole*: Lansing & Lonstein 2006* (anteroventral preoptic area, periventricular anterior hypothalamus, arcuate nucleus, zona incerta, posterodorsal hypothalamus)
No signif. difference	
Females have more	**RODENT** *Rat*: Simerly 1989* (anteroventral periventricular area); Simerly et al. 1997 (anteroventral periventricular area; *Prairie Vole*: Lansing & Lonstein 2006* (anteroventral periventricular area after gonadectomy)

2.8.1.17. Decrease in Tyrosine Hydroxylase With Age

One study found that tyrosine hydroxylase decreased more among males than among females with age (Table 2.8.1.17).

Table 2.8.1.17. Decrease in tyrosine hydroxylase with age.

Nature of Any Difference	Multiple Age Categories
Males decrease more	**RODENT** *Rat*: Ferrandez-Riaz et al. 1992 (ages 2 months to 2 years, in the striatum & the limbic forebrain)
No signif. difference	
Females decrease more	

2.8.2. Peptides

A peptide is a molecule comprised of two or more amino acids that are smaller than proteins (which by definition must consist of at least 50 amino acids). Some peptides are also classified as hormones. Below are findings pertaining to gender differences in peptides.

2.8.2.1. Activin-A

Activin-A is a peptide that enhances the follicular stimulating hormone and aids in the regulation of the menstrual cycle in females. Other functions of activin-A include that of promoting cell proliferation and fighting infections after skin lesions. The limited evidence thus far has not reached consensus concerning any significant sex difference in activin-A levels (Table 2.8.2.1).

Table 2.8.2.1. Activin-A.

Nature of Any Difference	Prepubertal	Postpubertal
	Childhood	Adolescent
More in males		
No signif. difference		**EUROPE** *Italy*: Luisi et al. 2001
More in females	**OCEANIA** *Australia*: CM Foster et al. 2004:1670 (higher concentrations)	

2.8.2.2a. Cholecystokinin

Cholecystokinin is a peptide found in the brain as well as in the rest of the body. It helps to stimulate pituitary and pancreatic enzyme secretions. According to one study of rats, males have more cholecystokinin than females do in at least one subcortical region (Table 2.8.2.2a).

Table 2.8.2.2a. Cholecystokinin.

Nature of Any Difference							
					Postpubertal		
						Adult	
More in males						**RODENT** *Rat*: Watson & Hoffman 1983 (fibers in the SDN-POA)	
No signif. difference							
More in females							

2.8.2.2b. Cholecystokinin Production Suppression With Age

One study of rats reported that cholecystokinin production decreases with age to a greater degree in males than in females (Table 2.8.2.2b).

Table 2.8.2.2b. Cholecystokinin production suppression with age.

Nature of Any Difference							
					Postpubertal		
						Adult	
More in males						**RODENT** *Rat*: Miyasaka et al. 1997	
No signif. difference							
More in females							

2.8.2.3. Inhibin-A

Inhibin-A is secreted by the gonads of both sexes and functions to inhibit the production of follicle-stimulating hormone by the pituitary gland located at the base of the brain. As shown in Table 2.8.2.3, there are either no sex differences in the production of inhibin-A or females produce greater quantities than do males. The answer may vary by age.

Table 2.8.2.3. Inhibin-A.

Nature of Any Difference	Prepubertal				Postpubertal		
	Infant	Toddler	Early Childhood	Childhood	Adolescent	Adult	
More in males							
No signif. difference		**NORTH AMERICA** *United States*: Bergada et al. 1999* (production)	**NORTH AMERICA** *United States*: Bergada et al. 1999* (production)	**EUROPE** *Sweden*: Sehested et al. 2000* (production) **NORTH AMERICA** *United States*: Bergada et al. 1999* (production)			
More in females	**NORTH AMERICA** *United States*: Bergada et al. 1999* (neonate, production)				**EUROPE** *Sweden*: Sehested et al. 2000* (production) **NORTH AMERICA** *United States*: Bergada et al. 1999* (production) **OCEANIA** *Australia*: CM Foster et al. 2004 (production)	**EUROPE** *Sweden*: Sehested et al. 2000* (production)	

2.8.2.4. Inhibin-B

Like inhibin-A (see above), inhibin-B is produced in the gonadal cells of both sexes. However, unlike the mixed results concerning sex differences in the production of inhibin-A, studies have consistently found higher levels of inhibin-B among males relative to females (Table 2.8.2.4).

Table 2.8.2.4. Inhibin-B.

Nature of Any Difference	Prepubertal				Postpubertal		Multiple Age Categories
				Childhood	Adolescent		
More in males				**OCEANIA** *Australia*: CM Foster et al. 2004:1670 (higher concentrations)	**EUROPE** *Sweden*: A Anderson et al. 1997 (higher concentrations)		**NORTH AMERICA** *United States*: Crofton et al. 2002 (higher concentrations)
No signif. difference							
More in females							

2.8.2.5. Tryptophan

Tryptophan is an essential amino acid formed from proteins during the digestion of various foods. It is a precursor to such substances as serotonin and niacin. As shown in Table 2.8.2.5, one study found various areas of the female brain in rats containing higher tryptophan levels than corresponding areas in the brains of males.

Table 2.8.2.5. Tryptophan.

Nature of Any Difference					Postpubertal	
						Adult
More in males						
No signif. difference						
More in females						**RODENT** *Rat*: Carlsson & Carlsson 1988 (in the neocortex, the striatum, the brainstem)

2.9
LONG CHAIN BIOCHEMICALS FOUND PRIMARILY OUTSIDE THE BRAIN

There are various yet-to-be standardized classifications for long chain biochemicals. Nevertheless, in the following section, they are considered those with 50 or more amino acids. Two categories will be considered: proteins and non-proteins.

2.9.1. Proteins

Proteins are the essential building blocks of life, and come in a wide variety of forms and functions. The tables below summarize the findings surrounding gender differences in several proteins.

2.9.1.1. Adiponectin Concentrations

Adiponectin is a recently identified, insulin-sensitizing, and anti-inflammatory protein, which appears to be reduced in obese persons. It suppresses endothelial activation. The one available study of sex differences indicated that adiponectin is higher among females than males (Table 2.9.1.1).

Table 2.9.1.1. Adiponectin concentrations.

Nature of Any Difference					Postpubertal	
						Adult
Males higher						
No signif. difference						
Females higher						**NORTH AMERICA** *United States*: Cnop et al. 2003

2.9.1.2. Apolipoprotein B

Apolipoprotein B exists in various forms, and appears to affect blood cholesterol levels. The one study of sex differences in apolipoprotein B levels involved rats and concluded that no significant difference existed (Table 2.9.1.2).

Table 2.9.1.2. Apolipoprotien B.

Nature of Any Difference					Postpubertal	
						Adult
Males higher						
No signif. difference						**RODENT** *Rat*: Cnop et al. 2003:461
Females higher						

2.9.1.3. Beta-Nerve Growth Factor Levels

One study of the beta-nerve growth factor concluded that sex differences in its levels varied according to the region of the brain examined (Table 2.9.1.3).

Table 2.9.1.3. Beta-nerve growth factor levels.

Nature of Any Difference					Postpubertal	
						Adult
Males higher						**RODENT** *Mouse*: Katoh-Semba et al. 1994* (in the cerebellum, olfactory bulb, hypothalamus, & pituitary)
No signif. difference						**RODENT** *Mouse*: Katoh-Semba et al. 1994* (in the neocortex, hippocampus, striatum, septum, & brainstem)
Females higher						

2.9.1.4. C-Reactive Protein Levels

C-reactive protein (CRP) increases during systemic inflammation. Research has suggested that CRP levels in the blood are associated with an increased risk of cardiovascular disease. Research has reached inconsistent conclusions regarding any gender difference in CRP levels (Table 2.9.1.4).

Table 2.9.1.4. C-reactive protein levels.

Nature of Any Difference					Postpubertal	
						Adult
Males higher						**EUROPE** *France*: Pieroni et al. 2003:135 **NORTH AMERICA** *United States*: McConnell et al. 2002
No signif. difference						**NORTH AMERICA** *United States*: Rifai & Ridker 2003
Females higher						**NORTH AMERICA** *United States*: Khera et al. 2005

2.9.1.5. Corticosteroid-Binding Globulin (CBG or Transcortin)

According to the most recent nomenclature, transcortin is called serpin peptidase inhibitor, class A, member 6. It is a protein that binds to cortisol, aldosterone, and/or progesterone. Cortisol is probably not biologically active when bound to transcortin. According to one study, females have higher levels of transcortin than do males (Table 2.9.1.5).

Table 2.9.1.5. Corticosteroid-binding globulin (CBG or transcortin).

Nature of Any Difference					Postpubertal	
						Adult
Males higher						
No signif. difference						
Females higher						**EUROPE** *Netherlands*: Stolk et al. 1996:314 (elderly)

2.9.1.6. Cortisol to Corticosteroid-Binding Globulin (CBG or Transcortin) Ratio

Cortisol bound to CBG is likely to be biologically inactive. Thus, individuals may have similar levels of cortisol, but cortisol will have a greater effect in those with a higher ratio of cortisol to CBG. Males appear to have a higher ratio than females (Table 2.9.1.6).

Table 2.9.1.6. Corticosteroid-binding globulin (CBG or transcortin).

Nature of Any Difference					Postpubertal	
						Adult
Males higher						**EUROPE** *Netherlands*: Stolk et al. 1996:314 (elderly, estimate of free cortisol levels)
No signif. difference						
Females higher						

2.9.1.7. Follistatin Concentrations

Follistatin is a protein produced by the gonad. It binds and inhibits activin, which acts in the pituitary to stimulate the release of follicle-stimulating hormone (FSH). Thus, the net effect of follistatin is to block the activin-induced release of FSH. One study failed to find a significant sex difference in the level of this protein (Table 2.9.1.7).

Table 2.9.1.7. Follistatin concentrations.

Nature of Any Difference	Prepubertal
	Childhood
Males higher	
No signif. difference	**OCEANIA** *Australia*: CM Foster et al. 2004:1670
Females higher	

2.9.1.8. Heat Shock Protein (HSP72)

Heat shock proteins are a family of proteins induced when cells are exposed to elevated temperatures. These proteins can be induced by a variety of other cellular challenges as well, including hypoxia and inflammation. Heat shock protein 72 (HSP72) is one member of this family. Among other things, HSP72 expression in muscle tissue has been linked to exercise. It also appears to be cardioprotective. Sex differences in HSP72 expression appear to vary by the type of tissue examined (Table 2.9.1.8).

Table 2.9.1.8. Heat shock protein (HSP72).

Nature of Any Difference	Postpubertal
	Adult
Males higher	**RODENT** *Rat*: Voss et al. 2003* (in muscle tissue)
No signif. difference	**RODENT** *Rat*: Voss et al. 2003* (in liver)
Females higher	**RODENT** *Rat*: Voss et al. 2003* (in heart and kidney)

2.9.1.9. Leptin

Leptin is a protein that aids in regulating appetite. The measurement of leptin levels usually involves sampling concentrations in the blood. Research summarized in Table 2.9.1.9 has very consistently shown that for all age groups studied, females have higher average levels of leptin in their blood than do males.

Table 2.9.1.9. Leptin.

Nature of Any Difference	Prepubertal		Postpubertal		Multiple Age Categories
	Early Childhood	Childhood	Adolescent	Adult	
Males higher					
No signif. difference					
Females higher	**NORTH AMERICA** *United States*: Hassink et al. 1996	**NORTH AMERICA** *United States*: KJ Ellis & Nicolson 1997; Nagy et al. 1997; Wabitsch et al. 1997*; Roemmich et al. 1998	**NORTH AMERICA** *United States*: Ambrosius et al. 1998; Ostlund et al. 1996; WF Blum et al. 1997; Wabitsch et al. 1997*	**ASIA** *China*: Sheu et al. 1999 **EUROPE** *Belgium*: Seck et al. 1998 (elderly); *Italy*: Vettor et al. 1997; Casabiell et al. 1998; Licinio et al. 1998; Pineiro et al. 1999; *Spain*: Garcia-Mayor et al. 1997; *Sweden*: Hellstrom et al. 2000:459 **NORTH AMERICA** *United States*: Baumgartner et al. 1999; Considine et al. 1996; Comuzzie et al. 1997*; Haffner et al. 1996*; Havel et al. 1996; Saad et al. 1997*; LJ Martin et al. 2002a*; Maffei et al. 1995; Hickey et al 1996; Ostlund et al. 1996; Rosenbaum et al. 1996*; SB Roberts et al. 1997; Saad et al. 1997*; Cnop et al. 2003:461; LC Klein et al. 2004	**NORTH AMERICA** *Canada*: Sin & Man 2003; *United States*: Maffei et al. 1995*; Considine et al. 1996 (obese); Haffner et al. 1996* (Mexican-American); Rosenbaum et al. 1996*; Comuzzie et al. 1997*; LJ Martin et al. 2002b:16 (Mexican-American)

2.9.1.10. Neurotrophin-3 Nerve Growth Factor

Neurotrophin-3 (NT-3) is a member of the nerve growth factor (NGF) family. It has several stimulatory effects on neurons such as growth stimulation and differentiation of new neurons. Mice in which the gene for NT-3 is rendered non-functional have particular problems with proprioception and some types of sensory neurons. One study found no sex differences in NT-3 expression in the neonatal rat (Table 2.9.1.10).

Table 2.9.1.10. Neurotrophin-3 nerve growth factor.

Nature of Any Difference	Prepubertal
	Infant
Males higher	
No signif. difference	**RODENT** *Rat*: N Sugiyama et al. 2003 (embryonic/neonatal, in the ventromedial hypothalamus)
Females higher	

2.9.1.11. Norbin

Norbin is a protein that helps to extend the length of neurites during development. One study of young adult rats found no significant gender difference in the level of this protein in the neocortex. However, in older adult rats, norbin levels were higher in males than in females (Table 2.9.1.11).

Table 2.9.1.11. Norbin.

Nature of Any Difference	Postpubertal
	Adult
More in males	**RODENT** *Rat*: Mani et al. 2001* (older, in the neocortex)
No signif. difference	**RODENT** *Rat*: Mani et al. 2001* (young, in the neocortex)
More in females	

2.9.1.12. Raf-1 Protein

Raf-1 is the protein product of the *c-Raf* gene. It is a kinase that phosphorylates proteins at serine/threonine residues. It is one component of the MAPK/ERK signal transduction pathway and is thought to be an important regulator of the cell-cycle. It is likely to be very important during development. Dysfunction of Raf-1 may play a role in cancer in adults. Table 2.9.1.12 suggests that there may be sex differences in Raf-1 expression during development in some, but not all, brain regions of the rat.

Table 2.9.1.12. Raf-1 Protein.

Nature of Any Difference	Prenatal
More in males	
No significant difference	**RODENT** *Rat*: Whorf & Tobet 1992* (embryo, in the brainstem & cortex)
More in females	**RODENT** *Rat*: Whorf & Tobet 1992* (embryo, in the hypothalamus)

2.9.1.13. Resistin

The protein resistin has been discovered in a number of mammalian species. Resistin appears to antagonize the action of insulin and may be linked in some ways to obesity (Morash et al. 2004). Studies of gender differences indicate that males exhibit higher levels of resistin than females (Table 2.9.1.13).

Table 2.9.1.13. Resistin.

Nature of Any Difference	Postpubertal	
	Adolescent	Adult
Males more	**RODENT** *Mouse*: Morash et al. 2004	**NORTH AMERICA** *United States*: Yannakoulia et al. 2003 **RODENT** *Mouse*: Steppan et al. 2001
No signif. difference		
Females more		

2.9.1.14. Sex Hormone Binding Globulin

Sex hormone binding globulin (SHBG), also known as testosterone-estrogen binding globulin, is a protein with a high affinity for most androgens and estrogens. When SHBG is bound to a sex hormone molecule, the molecule is prevented from leaving the blood system. As one can see in Table 2.9.1.14, most but not all studies have found SHBG to be significantly higher in females than in males.

Table 2.9.1.14. Sex hormone binding globulin.

Nature of Any Difference					Postpubertal	Multiple Age Categories
					Adult	
More in males					**EUROPE** *Britain*: Halari et al. 2005:107 (young)	
No signif. difference						
More in females					**ASIA** *China*: Yie et al. 1990 **NORTH AMERICA** *United States*: SK Cunningham & McKenna 1988; Bukowski et al. 2000	**NORTH AMERICA** *United States*: LJ Martin et al. 2002:16 (Mexican-American)

2.9.1.15. 5-Hydroxyindole Acetic Acid

5-Hydroxyindole acetic acid (5-HIAA) is a metabolic byproduct of serotonin detectable in the urine. According to the limited available research with rodents, females have higher levels of 5-HIAA than do males (Table 2.9.1.15).

Table 2.9.1.15. 5-Hydroxyindole acetic acid.

Nature of Any Difference					Postpubertal
					Adult
Males more					
No signif. difference					
Females more					**RODENT** *Mouse*: A Heller et al. 2001 (all animals were prenatally exposed to methamphetamine); *Rat*: Carlsson & Carlsson 1988 (in the neocortex, the limbic forebrain, the preoptic area of the hypothalamus, the striatum, the brainstem)

2.9.1.16. Plasminogen Activator Inhibitor-1

Plasminogen activator inhibitor-1 (PAI-1) has been implicated in neural degeneration. It feeds into the transforming growth factor (TGF) pathway, which has been implicated more directly in neural survival and Parkinson's disease. The plasminogen activator inhibitor-1 gene appears to be more active after exposure to a neurotoxin in males than females, perhaps providing a mechanism by which females are more resistant to neurodegeneration than males. According to the one available study, PAI-1 levels are greater in males than in females (Table 2.9.1.16).

Table 2.9.1.16. Plasminogen Activator Inhibitor-1.

Nature of Any Difference					Postpubertal
					Adult
Males more					**RODENT** *Rat*: Dluzen et al. 2003 (increase in striatal mRNA level after methamphetamine)
No signif. difference					
Females more					

2.9.1.17. Transforming Growth Factor-Beta

Transforming growth factor-beta has been implicated in neural survival whose alterations may play a role in the development of Parkinson's disease. It appears to play a role in cancer, development, and differentiation. No significant sex difference in this factor was found in the one relevant study (Table 2.9.1.17).

Table 2.9.1.17. Transforming growth factor-beta.

Nature of Any Difference					Postpubertal
					Adult
Males more					
No signif. difference					**RODENT** *Rat*: Dluzen et al. 2003 (increase in striatal mRNA level after methamphetamine)
Females more					

2.9.1.18. Transforming Growth Factor-Beta Receptor, Type 2

Transforming growth factor-beta acts through one of several receptors, including the type 2 receptor. The one relevant study reported no significant gender difference (Table 2.9.1.18).

Table 2.9.1.18. Transforming growth factor-beta receptor, type 2.

Nature of Any Difference						Postpubertal
						Adult
Males more						
No signif. difference						**RODENT** *Rat*: Dluzen et al. 2003 (increase in striatal mRNA level after methamphetamine)
Females more						

2.9.1.19. Activin-Like Kinase 5

Activin-like kinase 5 is part of the transforming growth factor-beta (TGF-beta) signaling pathway. Activin-like kinase 5 acts as a receptor for TGF-beta. Thus, it may mediate some of TGF-beta's effects on cellular regeneration and embryonic development. In the rat, there appears to be no sex difference in activin-like kinase 5 expression (Table 2.9.1.19).

Table 2.9.1.19. Activin-like kinase 5.

Nature of Any Difference						Postpubertal
						Adult
Males more						
No signif. difference						**RODENT** *Rat*: Dluzen et al. 2003 (increase in striatal mRNA level after methamphetamine)
Females more						

2.9.1.20. Fibronectin

Fibronectin is a large glycoprotein best known for its role in wound healing. It is a structural protein that binds to several cellular components. Fibronectin produced by the liver is present in the blood. It is produced by several other types of cells and is localized in the intercellular space. Basal levels and its regulation by methamphetamine appear to be similar in both sexes (Table 2.9.1.20).

Table 2.9.1.20. Fibronectin.

Nature of Any Difference						Postpubertal
						Adult
Males more						
No signif. difference						**RODENT** *Rat*: Dluzen et al. 2003 (increase in striatal mRNA level after methamphetamine)
Females more						

2.9.1.21. Beta-Actin

Beta-actin is one form an actin, a large structure protein that helps form the cytoskeleton. Actin provides structural support for the cell and allows for movement (among many other functions). In muscle issue dit, along with myosin, is the basis for muscular contraction. It is one of the most abundant proteins. In the frontal cortex, males may have more beta-actin than females (Table 2.9.1.21).

Table 2.9.1.21. Beta-actin.

Nature of Any Difference						Postpubertal
						Adult
Males more						**EUROPE** *England*: Preece & Cairns 2003 (mRNA in frontal cortex measured by real-time RT-PCR)
No signif. difference						
Females more						

2.9.1.22. Steroidogenic Acute Regulatory Protein (StAR)

Steroidogenic acute regulatory protein (StAR) appears to underlie the acute activation of steroidogenesis. This protein is found in the ovary, the adrenal gland, and the brain. The one available study reached somewhat different conclusions regarding any possible sex differences in StAR levels (Table 2.9.1.22).

Table 2.8.1.22. Steroidogenic acute regulatory protein (StAR).

Nature of Any Difference					Postpubertal		Multiple Age Categories
						Adult	
Males more						**RODENT** *Rat*: Lavaque et al. 2005* (mRNA in cerebellum)	**RODENT** *Rat*: Lavaque et al. 2005* (mRNA in cerebellum on postnatal day 10)
No signif. difference							**RODENT** *Rat*: Lavaque et al. 2005* (mRNA in cerebellum on postnatal days 1, 5, 15, 20, 30)
Females more							

2.9.1.23. Cyclophilin

Cyclophilin (CyP) is an enzyme that facilitates the folding of proteins by helping *trans* bonds at proline residues transform into *cis* bonds. One study suggested that males have more cyclophilin in the prefrontal cortex than do females (Table 2.9.1.23).

Table 2.9.1.23. Cyclophilin.

Nature of Any Difference					Postpubertal	
						Adult
Males more						**EUROPE** *England*: Preece & Cairns 2003 (mRNA in frontal cortex measured by real-time RT-PCR)
No signif. difference						
Females more						

2.9.1.24. Microtubule-Associated Protein 2 (MAP-2)

Microtubule-associate protein-2 (MAP-2), as the name implies, interacts with the microtubules. Microtubules are major components of the cytoskeleton. Mictrotubule-associated proteins are a large family of proteins. MAP-2, however, appears to be neuron-specific and localized more in the dendrites than other parts of the neuron. In the prefrontal cortex, men may have more MAP-2 than females (Table 2.9.1.24).

Table 2.9.1.24. Microtubule-associated protein 2 (MAP-2).

Nature of Any Difference					Postpubertal	
						Adult
Males more						**EUROPE** *England*: Preece & Cairns 2003 (mRNA in frontal cortex measured by real-time RT-PCR)
No signif. difference						
Females more						

2.9.1.25. Glial Fibrillary Acidic Protein

Glial fibrillary acidic protein (GFAP) is a large protein that is classified as an intermediate filament. As the name implies, it is relatively specific to glial cells, more specifically, astrocytes. There appears to be a higher expression of GFAP in the frontal cortex of men than of women (Table 2.9.1.25).

Table 2.9.1.25. Glial fibrillary acidic protein.

Nature of Any Difference					Postpubertal	
						Adult
Males more						**EUROPE** *England*: Preece & Cairns 2003 (mRNA in frontal cortex measured by real-time RT-PCR)
No signif. difference						
Females more						

2.9.1.26. Amyloid Precursor Protein, Isoform 770

Amyloid precursor protein (APP) is a large transmembrane glycoprotein. Amyloid proteins are derived from APP. Altered expression of amyloid proteins have been implicated in Alzheimer's disease. One isoform of APP seems to be expressed more in the male frontal cortex than in that of females (Table 2.9.1.26).

Table 2.9.1.26. Amyloid precursor protein, isoform 770.

Nature of Any Difference					Postpubertal
					Adult
Males more					**EUROPE** *England*: Preece & Cairns 2003 (mRNA in frontal cortex measured by real-time RT-PCR)
No signif. difference					
Females more					

2.9.1.27. Corticotropin-Releasing Hormone-Binding Protein

Corticotropin-releasing hormone-binding protein (CRH-BP) helps to modulate the function of corticotropin-releasing hormone (CRH), an important stimulator of the hypothalamic-pituitary-adrenal (HPA) axis, by binding to CRH. When CRH-BP binds to CRH, CRH can not activate its receptor and therefore fails to exert an effect. According to one rodent study, females have higher levels of CRH-BP than do males (Table 2.9.1.27).

Table 2.9.1.27. Corticotropin-releasing hormone-binding protein.

Nature of Any Difference					Postpubertal
					Adult
Males more					
No signif. difference					
Females more					**RODENT** *Mouse*: Speert et al. 2002 (C57BL/6J strain; mRNA in pituitary)

2.9.2. Long Chain Biochemicals Other Than Proteins

Certain complex biochemicals other than proteins are comprised of long molecular chains. The findings concerning sex differences in these biochemicals are presented below.

2.9.2.1. ACTH, Output of

Adrenocorticotrophic hormone (ACTH) is released by the pituitary gland. It triggers the release of cortisol from the adrenal gland. In the rat, females may release more ACTH than males, although one study failed to identify a significant gender difference (Table 2.9.2.1).

Table 2.9.2.1. ACTH, output of.

Nature of Any Difference							Multiple Age Categories
Greater in males							
No signif. difference							**RODENT** *Rat*: Park et al. 2003 (ACTH levels in unstressed animals)
Greater in females							**RODENT** *Rat*: Critchlow et al. 1963; Kitay 1963; JL Dunn et al. 1972

2.9.2.2. Cholesterol Levels in General

Cholesterol is an essential biochemical out of which many hormones are formed. Studies of total cholesterol levels have provided inconsistent evidence regarding any gender difference (Table 2.9.2.2). Among the likely reasons for these inconsistencies are the types of sampling sources used and the age and race/ethnicity of the subjects studied. Also, as discussed more in the two tables that follow the present one, two types of cholesterol are recognized, and nearly all studies have found a sex difference in one, but not in the other.

Regarding age, several studies have shown that female levels of cholesterol rise substantially following menopause, a period in the female life course marked by a decline in the production of estradiol, a major cholesterol inhibiting hormone (Roesters van Lennep et al. 2002).

Table 2.9.2.2. Cholesterol levels in general.

Nature of Any Difference	Prepubertal				Postpubertal		Multiple Age Categories
			Early Childhood	Childhood	Adolescent	Adult	
Higher in males			**NORTH AMERICA** *United States*: Berenson et al. 1978* (Black)	**NORTH AMERICA** *United States*: Resnicow et al. 1989* (Blacks); DS Freedman et al. 1992:171* (Blacks)		**EUROPE** *Britain*: Dunnell et al. 1999* (elderly) **NORTH AMERICA** *United States*: FE Kuhn & Rackley 1993 (middle age)	**EUROPE** *Germany*: Brosche et al. 2001 (fingernails) **NORTH AMERICA** *Canada*: Choiniere et al. 2000:S15
No signif. difference					**OCEANIA** *Solomon Islands*: LB Page et al. 1974*	**EUROPE** *France*: Tremollieres et al. 1999 (elderly) **NORTH AMERICA** *United States*: National Center for Health Statistics 1980 (young); SA Brown et al. 1993 (elderly); CE Davis et al. 1994 (elderly); Paeratakul et al. 2002:1206 **OCEANIA** *Solomon Islands*: LB Page et al. 1974* (prior to age 50)	**NORTH AMERICA** *Canada*: Pascot et al. 2002:401*
Higher in females			**NORTH AMERICA** *United States*: Berenson et al. 1978* (Whites)	**ASIA** *Japan*: Kouda et al. 2004:81 (older) **NORTH AMERICA** *United States*: Resnicow et al. 1989* (Whites); DS Freedman et al. 1992:171* (Whites)		**EUROPE** *Britain*: Dunnell et al. 1999* (middle aged) **NORTH AMERICA** *United States*: Wingard et al. 1983:167 (White); Koertge et al. 2003:1320 (CAD patients) **OCEANIA** *Solomon Islands*: LB Page et al. 1974* (beyond age 50)	**NORTH AMERICA** *United States*: S Linn et al. 1989; Department of Health & Human Services 2001:48 **RODENT** *Guinea Pig*: S Roy et al. 2000

2.9.2.3. Cholesterol, High Density Levels

High density (“good”) cholesterol (HDL) is not the type that tends to clog the arteries. In fact, it seems to protect against heart disease. Most studies have found that females have higher levels of HDL cholesterol than do males except in the case of patients with diabetes where the reverse has sometimes been found. Also, one study of 10 to 11-year-olds found no significant difference in HDL cholesterol levels, but for 13 to 14-year-olds females exhibited higher levels. Among mice, one study reported that HDL cholesterol was higher among males then females (Table 2.9.2.3).

Table 2.9.2.3. Cholesterol, high density levels.

Nature of Any Difference	Prepubertal				Postpubertal		Multiple Age Categories
				Childhood	Adolescent	Adult	
Higher in males						**RODENT** *Mouse*: Korstanje et al. 2004:883	**NORTH AMERICA** *United States*: Walden et al. 1984 (diabetes sufferers); Goldschmidt et al. 1994 (diabetes sufferers)
No signif. difference				**ASIA** *Japan*: Kouda et al. 2003:1107* (older)			
Higher in females					**ASIA** *Japan*: Kouda et al. 2003:1107* (young)	**NORTH AMERICA** *United States*: HM Wilson et al. 1990 (elderly); Cnop et al. 2003:461; Ardern et al. 2004:1612	**ASIA** *Taiwan*: Hsu et al. 2002:58 **NORTH AMERICA** *Canada*: Lemieux et al. 1994; Pascot et al. 2002:402; *United States*: Li et al. 1996; Ohta et al. 1989; KM Anderson et al. 1987; SA Brown et al. 1993; BV Howard et al. 1995:393; Koertge et al. 2003:1320 (CAD patients) **OCEANIA** *Australia*: Wang & Hoy 2004:510 (aborigines, diabetes sufferers)

2.9.2.4. Cholesterol, Low Density Levels

The type of cholesterol that is most likely to clog arteries is low density cholesterol (also called “bad cholesterol”). Generalizing about gender differences in LDL cholesterol levels is difficult for reasons mentioned above in relationship to total cholesterol levels (Table 2.9.2.4).

Table 2.9.2.4. Cholesterol, low density levels.

Nature of Any Difference	Prepubertal			Postpubertal		Multiple Age Categories
			Childhood		Adult	
More in males			**NORTH AMERICA** *United States*: Donker et al. 1997:404		**NORTH AMERICA** *United States*: Ardern et al. 2004:1612	**NORTH AMERICA** *Canada*: Pascot et al. 2002:401 *United States*: Li et al. 1986; Ohta et al. 1986; KM Anderson et al. 1987; SA Brown et al. 1993
No signif. difference					**ASIA** *Taiwan*: Hsu et al. 2002:58 (elderly) **EUROPE** *France*: Tremollieres et al. 1999 (elderly) **NORTH AMERICA** *United States*: National Center for Health Statistics 1987 (young); SA Brown et al. 1993 (elderly); CE Davis et al. 1994 (elderly); BV Howard et al. 1995:393; Cnop et al. 2003:461	
More in females					**NORTH AMERICA** *United States*: Koertge et al. 2003:1320 (CAD patients)	

2.9.2.5. Cotinine

Serum levels of cotinine rise among persons who smoke. One study reported that males had higher average levels of serum cotinine than did females but that this was due entirely to the fact that males in their sample were more likely to be smokers (Table 2.9.2.5).

Table 2.9.2.5. Cotinine.

Nature of Any Difference							Multiple Age Categories
Male levels more elevated							**NORTH AMERICA** *United States*: Kafai & Ganji 2003:15
No signif. difference							
Female levels more elevated							

2.9.2.6. Glucose

A couple of studies have compared males and females regarding the level of glucose (a naturally produced sugar) in the blood, which is used to help fuel various organs of the body, particularly the brain. Table 2.9.2.6 provides somewhat inconsistent evidence regarding the possibility of any significant gender difference.

Table 2.9.2.6. Glucose.

Nature of Any Difference					Postpubertal		
						Adult	
Males more						**NORTH AMERICA** *United States*: Wingard et al. 1983:167 (Whites, plasma levels glucose after fasting); Cnop et al. 2003:461	
No signif. difference						**EUROPE** *Netherlands*: Stolk et al. 1996:314 (elderly)	
Females more							

2.9.2.7. Homovanillic Acid

Homovanillic acid (HVA) is a metabolite of dopamine. Thus, HVA levels are thought to reflect the rate of dopamine turnover. Some studies suggest that abnormal HVA levels may be associated with psychopathology. With the exception of studies involving cadavers, females have been found to have higher plasma HVA levels than men (Table 2.9.2.7).

Table 2.9.2.7. Homovanillic acid.

Nature of Any Difference					Postpubertal		Multiple Age Categories
						Adult	
Males more							**NORTH AMERICA** *United States*: Sumiyoshi et al. 1997* (cadavers)
No signif. difference							**NORTH AMERICA** *United States*: Adolfsson et al. 1979 (cadavers)
Females more						**EUROPE** *Netherlands*: Giltay et al. 2005 (plasma, elderly) **NORTH AMERICA** *United States*: Koreen et al. 1994 (plasma); Sumiyoshi et al. 1997* (plasma) **RODENT** *Rat*: Dorce & Palermo-Neto 1994 (in the striatum)	

2.9.2.8. Change in Homovanillic Acid with Age

One study of rats found that homovanillic acid levels decrease with age to a greater degree in males than in females (Table 2.9.2.8).

Table 2.9.2.8. Change in homovanillic acid with age.

Nature of Any Difference					Postpubertal
					Adult
Males decrease more					**RODENT** *Rat*: Dorce & Palermo-Neto 1994 (from age 5 months to 23 months, in the striatum)
No signif. difference					
Females decrease more					

2.9.2.9. Insulin

Insulin is a protein-based hormone that aids in the metabolism of glucose. As shown in Table 2.9.2.9, the two available studies are not consistent with respect to having identified a sex difference in insulin levels among humans.

Table 2.9.2.9. Insulin.

Nature of Any Difference					Postpubertal
					Adult
Males more					**NORTH AMERICA** *United States*: Cnop et al. 2003:461
No signif. difference					**EUROPE** *Netherlands*: Stolk et al. 1996:314 (elderly)
Females more					

2.9.2.10. Lipoprotein(a) Levels

Lipoprotein(a) (also known as alpha-lipoprotein) consists of an LDL molecule linked to certain other molecules. Table 2.9.2.10 indicates that lipoprotein(a) in the blood tends to be higher in females than in males, at least during adolescence.

Table 2.9.2.10. Lipoprotein(a) levels.

Nature of Any Difference				Postpubertal	
				Adolescent	
Greater in males					
No signif. difference					
Greater in females				**ASIA** *Japan*: Srinivasan et al. 1985* (alpha-lipoprotein) **NORTH AMERICA** *United States*: Srinivasan et al. 1985* (alpha-lipoprotein)	

2.9.2.11. Lipoprotein(a) Levels as a Predictor of CHD

The levels of lipoprotein(a) in the blood is an established risk factor for coronary heart disease (Schaefer et al. 1994; Assmann et al. 1996). Two studies have found this predictive association to be stronger for males than for females (Table 2.9.2.11).

Table 2.9.2.11. Lipoprotein(a) levels as a predictor of CHD.

Nature of Any Difference					Postpubertal
					Adult
Greater in males					**NORTH AMERICA** *United States*: Seman et al. 1997; Wild et al. 1997
No signif. difference					
Greater in females					

2.9.2.12. Nitric Oxide

Nitric oxide is an organically produced gas. Outside of the brain, its functions are not well understood but within the brain, it functions as a neurotransmitter. One study compared the amount of nitric oxide exhaled in people's breath and concluded that females exhale consistently more than was the case for males (Table 2.9.2.12). A study of mice also concluded that females have higher levels.

Table 2.9.2.12. Nitric oxide.

Nature of Any Difference					Postpubertal		
						Adult	
Males more							
No signif. difference							
Females more						**EUROPE** *Austria*: Jilma et al. 1996 (young, exhaled in the breath) **RODENT** *Mouse*: Barna et al. 1996 (synthase production in CNS after viral infection)	

2.9.2.13. Rennin

Rennin is secreted by the kidneys and plays a role in changing angiotensinogen to angiotensin. The two available studies both concluded that levels of rennin are significantly higher in men than in women (Table 2.9.2.13).

Table 2.9.2.13. Rennin.

Nature of Any Difference					Postpubertal		
						Adult	
Males more						**NORTH AMERICA** *United States*: Danser et al. 1998; TJ Wang et al. 2002	
No signif. difference							
Females more							

2.9.2.14. Triglycerides

Triglycerides are the main chemicals comprising the fats in foods and in the body. Studies of sex differences in triglyceride levels have reached inconsistent conclusions (Table 2.9.2.14). Some of the inconsistencies may be the result of various conditions under which the levels were measured.

Table 2.9.2.14. Triglycerides.

Nature of Any Difference	Prepubertal				Postpubertal		Multiple Age Categories
				Childhood		Adult	
Males more						**ASIA** *Japan*: Srinivasan et al. 1985* **NORTH AMERICA** *United States*: Srinivasan et al. 1985*	**NORTH AMERICA** *Canada*: Pascot et al. 2002:401; *United States*: J Johansson at el. 1991
No signif. difference						**NORTH AMERICA** *United States*: Cnop et al. 2003:461; Koertge et al. 2003:1320 (CAD patients)	
Females more				**NORTH AMERICA** *United States*: Donker et al. 1997:404			

2.9.2.15. Triacylgycerols, Myocellular Levels of

During heavy exercise, females have been shown to produce higher triacylgycerol levels than males (Table 2.9.2.15).

Table 2.9.2.15. Triacylgycerols, myocellular levels of.

Nature of Any Difference					Postpubertal		Multiple Age Categories
						Adult	
Males more							
No signif. difference							
Females more						**EUROPE** *Denmark*: Roepstorff et al. 2002 (during heavy exercise) **NORTH AMERICA** *United States*: Starling et al. 1997 (during heavy exercise); Berhman et al. 1999 (during heavy exercise)	**NORTH AMERICA** *United States*: Kiens & Richter 1998 (during heavy exercise)

2.9.3. Trace Elements

Trace elements pertain to various minerals and other inorganic compounds found in the body. Findings of sex differences in these elements are reviewed in the following tables.

2.9.3.1. Selenium

Selenium is a trace element found to be statistically associated with lowered risks of cardiovascular disease (LeBouil et al. 1992; Macpherson et al. 1995) and cancer (Salonen et al. 1984), possibly due to its ability to help strengthen the immune system (Kiremidjian-Schumacher et al. 1996). Table 2.9.3.1 suggests that there are either no significant gender differences in selenium levels or that the levels are slightly higher in males than in females.

Table 2.9.3.1. Selenium.

Nature of Any Difference							Multiple Age Categories
Higher in males							**NORTH AMERICA** *United States*: D McMaster 1990; Kafai & Ganji 2003
No signif. difference							**EUROPE** *Slovakia*: Brtkova et al. 1994 **NORTH AMERICA** *United States*: AC Swanson et al. 1990
Higher in females							**RODENT** *Mouse*: Minami et al. 2002 (ddY strain; after selenium administration in lipopolysaccharide-injected mice)

2.9.3.2. Relationship Between Selenium Levels and Cancer

As noted above, low selenium levels have been found to be associated with an elevated probability of contracting cancer (Salonen et al. 1984). As shown in Table 2.9.3.2, most studies have found this association to be stronger for males than for females.

Table 2.9.3.2. Relationship between selenium levels and cancer.

Nature of Any Difference					Postpubertal		
						Adult	
Higher in males						**EUROPE** *Belgium*: Kornitzer et al. 2004; *Finland*: Knekt et al. 1990; *Netherlands*: Kok et al. 1987 **NORTH AMERICA** *United States*: Criqui et al. 1991	
No signif. difference						**ASIA** *Japan*: Ujiie & Kikuchi 2002	
Higher in females							

Chapter 3
HEALTH AND ILLNESS FACTORS

This chapter will review the vast array of findings regarding gender differences in health (and ill-health) as indicated by variations in general self-assessments, sicknesses, survival/longevity, diagnosed illnesses, and age of death. The evidence from this chapter reveals complex patterns with respect to male-female differences.

3.1
OVERALL HEALTH AND ILLNESS

As the concept is being used here, *overall health and illness* does not refer to any specific diseases. Instead, it has to do with such things as general feelings of health, annual disability days, and overall life expectancy.

3.1.1. Health and Illness Indicators

Most of the broadest types of health and illness indicators are based on self reports such as reports of the number of days one is too sick to leave the house and the number of physician visits one made in the past year. Also considered a general health and illness indicator is age of death.

3.1.1.1. Morbidity (Ill Health) in General

Morbidity refers to being in a state of ill-health. This can be measured in a variety of ways, but most commonly involves self-reports or, in the case of children, parental reports. As shown in Table 3.1.1.1, studies of children indicate that boys are sick more often than girls, while the preponderance of evidence from studies of adults indicates that women are ill more often than men. This pattern of findings is consistent with a review of the morbidity literature by Verbrugge and Wingard (1987).

Table 3.1.1.1. Morbidity (ill health) in general.

Nature of Any Difference	Prepubertal					Adult	Multiple Age Categories
	Infant			Childhood			
Greater in males	**EUROPE** *Britain*: Lucas et al. 1990 **NORTH AMERICA** *United States*: Monto & Ullman 1974			**EUROPE** *Britain*: Arber & Cooper 2000:127 (parental report)		**NORTH AMERICA** *United States*: C Elman & G Myers 1997; Marcus & Seeman 1981* (life-threatening); Haavio-Mannila 1986* (life-threatening)	
No signif. difference						**NORTH AMERICA** *United States*: PJ Bush & Osterweis 1978:186 (self-reported illnesses)	
Greater in females						**EUROPE** *Germany*: J Smith & M Baltes 1998 (elderly) **NORTH AMERICA** *Canada*: M Denton et al. 2004:2593 (chronic conditions of ill health); *United States*: US Dept of HEW 1973 (acute conditions); Nathanson 1975; Gove & Hughes 1979; Marcus & Seeman 1981* (non-life-threatening); Haavio-Mannila 1986* (non-life-threatening)	**EUROPE** *Netherlands*: van den Brekel 1987 **NORTH AMERICA** *United States*: Sydenstricker 1929; SD Collins 1940; A Damon 1964

3.1.1.2. Sickness/Disability Days (Excluding Pregnancy-Related Factors)

In a number of population surveys, respondents have been asked how often in the past year they recall having been so ill that they were unable to work or venture outside their residence. Many of these studies ask respondents not to include (or to report separately) pregnancy-related ill-health. Table 3.1.1.2 indicates that there are no consistent gender differences among school age children. However, studies of adolescent and adults largely indicate that until old age females report experiencing more sickness days per year than do males.

Table 3.1.1.2. Sickness/disability days (excluding pregnancy-related factors).

Nature of Any Difference	Prepubertal				Postpubertal		Multiple Age Categories
				Childhood	Adolescent	Adult	
More in males				**NORTH AMERICA** *United States*: RW Wilson 1973		**NORTH AMERICA** *United States*: Kalish 1975 (elderly)	
No signif. differ.				**NORTH AMERICA** *United States*: ML Bauer 1967:7*; Ahmed 1968:3*	**NORTH AMERICA** *United States*: ML Bauer 1967:7*	**NORTH AMERICA** *United States*: Ahmed 1968:3* (elderly); Steingart et al. 1991 (physical activity limitations among people with coronary artery disease); Pennebaker et al. 1998 (college)	**NORTH AMERICA** *Canada*: Walters et al. 2002:678*
More in females				**NORTH AMERICA** *United States*: Flores et al. 1999:1070; Tsao et al. 2002:219	**NORTH AMERICA** *United States*: Ahmed 1968:3*; AL Jackson 1971; MH Wilder 1972:9 **OCEANIA** *Australia*: R Fletcher & Hattie 2005:662	**ASIA**I *Taiwan*: Lu et al. 2005 (persons with IBS) **EUROPE** *Britain*: Marmot et al. 1987:113; *Netherlands*: Gijsbers van Wijk et al. 1991:102; *Sweden*: Karasek et al. 1987 **NORTH AMERICA** *United States*: US Department of H E W 1973 (restricted activity days); Marcus et al. 1980; Verbrugge & Ascione 1987	**ASIA** *Thailand*: Porapakkham 1983 **EUROPE** *Britain*: Blaxter 1989:203; Blaxter et al. 1990 (middle & upper status); Marmot et al. 1991:116; Nazroo 1997:18; *Sweden*: Rahkonen & Lahelma 1992 **NORTH AMERICA** *Canada*: Kandrack et al. 1991:585; Walters et al. 2002:678*; *United States*: Baetjer 1948; Hinkle et al. 1960; Fuchsberg 1963; Braine et al. 1966; ML Bauer 1967:7; Ahmed 1968:3; CS Wilder & Rivers 1969:8; Rutter 1972; MH Wilder 1972:11; Gottfried 1973; RW Wilson 1973; Nathanson 1975; Verbrugge 1976; Monto & Ross 1977:103; Mechanic 1978; Gove & Hughes 1979; Marcus & Seeman 1981; Hing et al. 1983; Waldron 1983c; Gove 1984; Verbrugge 1985b:159; Verbrugge & Madans 1985; Gift et al. 1992; Klonoff & Landerine 1992:355; Rudolf et al. 1992; Anson et al. 1993

3.1.1.3. Seeking/Utilizing Health Care Services or Advice in General

All studies of sex differences in tendencies to seek health care services and advice (other than for specific ailments) have indicated that females do so more than males (Table 3.1.1.3).

Table 3.1.1.3. Seeking/utilizing health care services or advice in general.

Nature of Any Difference					Postpubertal		Multiple Age Categories
					Adolescent	Adult	
Males more							
No signif. difference							
Females more					**NORTH AMERICA** *United States*: Verbrugge 1976a*; CE Lewis & Lewis 1989 (visits to school nurse); JF Sweeney & Sweeney 2000 (young, visits to school nurse)	**ASIA** *Hong Kong*: Hunt-McCool et al. 1995 **EUROPE** *Britain*: Office of Population Censuses & Surveys 1973 (excluding ob/gyn); *Finland*: Nyman & Kalimo 1973 **NORTH AMERICA** *United States*: R Andersen & Anderson 1967 (excluding ob/gyn); OW Anderson & Andersen 1972; Acton 1975; Verbrugge 1976a*; Cleary et al. 1982; Marcus & Siegel 1982; Sindelar 1982; Wilensky & Cafferata 1983; Meininger 1986; HW Neighbors & Howard 1987 (Blacks); Klonoff & Landrine 1992; Nice & Hilton 1994 (military personnel); Wyke et al. 1998; Saha et al. 1999 (heart disease); SJ Boyd et al. 2004 (blacks, AIDS symptoms)	**EUROPE** *Britain*: Nicholl et al. 1989 **NORTH AMERICA** *Canada*: Statistics Canada 1971 (excluding ob/gyn); *United States*: Lerner 1961 (excluding ob/gyn); Rudolf et al. 1992

3.1.1.4. Utilizing Health Care Services (May Include Ob/Gyn Visits)

The utilization of health care services is an important basic indicator of health, most studies of which do not separate visits for obstetrics and gynecological factors (which are more or less unique to females, particularly beyond adolescence). Consequently, it is not particularly surprising to find that among adolescents and adults, females utilize health care services more than males do according to nearly all available studies (Table 3.1.1.4).

Table 3.1.1.4. Utilizing health care services (may include ob/gyn visits).

Nature of Any Difference	Prepubertal				Postpubertal		Multiple Age Categories
	Infant	Toddler	Early Childhood	Childhood	Adolescent	Adult	
Males more			**NORTH AMERICA** *United States*: H Koch & McLemore 1978				
No signif. difference	**EUROPE** *Britain*: Saxena et al. 1999*	**EUROPE** *Britain*: Saxena et al. 1999*	**EUROPE** *Britain*: Saxena et al. 1999*	**EUROPE** *Britain*: Saxena et al. 1999* **NORTH AMERICA** *United States*: Tsao et al. 2002 (school nurse services)	**EUROPE** *Britain*: Saxena et al. 1999* **NORTH AMERICA** *United States*: C Nelson 1991* (young); Marcell et al. 2002* (young)	**OCEANIA** *Australia*: Waddell & Floate 1986	
Females more				**NORTH AMERICA** *United States*: Lewis & Lewis 1989 (school nurse services)	**EUROPE** *Germany*: Briscoe 1987; Holler & Hurrelman 1990; Settertobulte 1994 **NORTH AMERICA** *United States*: B Bloom 1982; C Nelson 1991* (older); Settertobulte & Kolip 1997; Marcell et al. 2002* (older); Cleary et al. 2004:46 (due to more mental disorders)	**ASIA** *China*: Anson & Sun 2002:1049 **EUROPE** *Britain*: Logan & Brooke 1957 (physician visits); Logan & Cushion 1958 (physician visits) **LATIN AMERICA** *Brazil*: Barreto et al. 2004 (elderly, medical service visits, health care services) **NORTH AMERICA** *United States*: Hathaway & Briggs 1957; US Dept. of HEW 1972 (physician visits); US Dept. of HEW 1973; Nathanson 1975; R Andersen et al. 1976; Mechanic 1976; Nathanson 1977; Ortmeyer 1979; Verbrugge 1979; Hoeper et al. 1980; Verbrugge 1980; Cleary et al. 1982; AC Marcus & Siegel 1982; Hibbard & Pope 1983; Verbrugge 1985a; Verbrugge 1985b; Hibbard & Pope 1986; Verbrugge 1988; Nicholl et al. 1989; Verbrugge 1989; Kandrack 1991; Kirmayer & Robbins 1991; Klonoff & Landrine 1992; Verbrugge & Patrick 1995; Macintyre 1996; C Green & C Pope 1999; AE Rhodes et al. 2002	**EUROPE** *Ireland*: Nolan 1994 **NORTH AMERICA** *United States*: OW Anderson 1963:352; Rosenstock 1966:96; Public Health Service 1967:64; Phillips & Segal 1969; ES Mathis 1973:3; Mellinger et al. 1974; Rabin & Bush 1975; DG Taylor et al. 1975; R Andersen et al. 1976; Rabin & Bush 1976; Tessler et al. 1976; Nathanson 1977b; Rabin 1977; PJ Bush & Osterweis 1978; Hing et al. 1983; Gove 1984; Annandale & Hunt 1990:35; Cafferata & Meyers 1990 **OCEANIA** *Australia*: Waddell & Floate 1986

3.1.1.5. Utilizing Health Care Services (Excluding Ob/Gyn Visits)

Studies of the utilization of health care services when obstetric and gynecological visits were specifically excluded are shown in Table 3.1.1.5. As one can see, this makes very little difference in the overall tendency for adolescent and adult females to utilize these services to a greater degree than males according to most studies.

Table 3.1.1.5. Utilizing health care services (excluding ob/gyn visits).

Nature of Any Difference	Prepubertal				Postpubertal		Multiple Age Categories
	Infant	Toddler	Early Childhood	Childhood	Adolescent	Adult	
Males more						**AFRICA** *Kenya*: Voeten et al. 2004 (STDs) **ASIA** *Bangladesh*: SM Ahmed et al. 2000:366	
No signif. difference	**NORTH AMERICA** *United States*: Newacheck 1992:34*	**NORTH AMERICA** *United States*: Newacheck 1992:34*	**NORTH AMERICA** *United States*: Newacheck 1992:34*	**NORTH AMERICA** *United States*: CS Wilder 1968:5*; Newacheck 1992:34*	**NORTH AMERICA** *United States*: Newacheck 1992:34*	**NORTH AMERICA** *United States*: GE Blanken 1971:71* (elderly)	**NORTH AMERICA** *United States*: Von Korff et al. 1991
Females more				**NORTH AMERICA** *United States*: CE Lewis et al. 1977	**NORTH AMERICA** *United States*: CS Wilder 1968:5*	**EUROPE** *Britain*: Dunnell & Cartwright 1972; Briscoe 1987; Corney 1990; Anson et al. 1993; CA Green & Pope 1999; I Banks 2001 (elderly); *Finland*: Lahelma et al. 1999; *Germany*: Ladwig et al. 2000; *Netherlands*: Gijsbers van Wijck 1991:102; Gijsbers van Wijck et al. 1992 **NORTH AMERICA** *Canada*: Boucher 1975 (surgery); *United States*: Feldstein 1966 (expenditures for medical services); Avent 1967 (surgery); CS Wilder 1968:5 * (middle age & elderly); GE Blanken 1971:71*; ES Mathis 1977 (elderly); Mechanic 1978; Cleary et al. 1982; AC Marcus & Seigel 1982; Nathanson & Lorenz 1982; Verbrugge 1985:160; Arber & Ginn 1993 (elderly); Pini et al. 1995; Tudiver & Talbot 1999; KS Field & Briggs 2001 **OCEANIA** *Australia*: Parslow et al. 2004	**NORTH AMERICA** *United States*: Hooper et al. 1982; JS Brown & McCreedy 1986; K Dean 1989; Adelman & Koch 1991; Roter et al. 1991; JA Hall et al. 1994; CE Ross & Bird 1994; Britt et al. 1996

3.1.1.6. Seeking/Utilizing Services From a Dermatologist

One study investigated gender differences in consulting with a dermatologist for a wide range of age groups. It found that from school age through full adulthood, females were more likely to consult with a dermatologist than were males. Among preschoolers and the elderly, however, there were no sex differences (Table 3.1.1.6).

Table 3.1.1.6. Seeking/utilizing services from a dermatologist.

Nature of Any Difference	Prepubertal		Postpubertal	
	Early Childhood	Childhood	Adolescent	Adult
Males more				
No signif. difference	**NORTH AMERICA** *United States*: Hannaford 1966:27*			**NORTH AMERICA** *United States*: Hannaford 1966:27* (elderly)
Females more		**NORTH AMERICA** *United States*: Hannaford 1966:27*	**NORTH AMERICA** *United States*: Hannaford 1966:27*	**NORTH AMERICA** *United States*: Hannaford 1966:27* (young & middle age)

3.1.1.7. Seeking/Utilizing Services From an Orthopedist/Bone Specialist

One study reported sex ratios of persons who consulted with an orthopedist for specific age groupings. It found that males were more likely to be involved in these consultations until full adulthood, at which time no sex differences were apparent. In old age, female consultations exceeded those of males (Table 3.1.1.7).

Table 3.1.1.7. Seeking/utilizing services from an orthopedist/bone specialist.

Nature of Any Difference	Prepubertal	Postpubertal	
	Childhood	Adolescent	Adult
Males more	**NORTH AMERICA** *United States*: Hannaford 1966:32*	**NORTH AMERICA** *United States*: Hannaford 1966:32*	**NORTH AMERICA** *United States*: Hannaford 1966:32* (young)
No signif. difference			**NORTH AMERICA** *United States*: Hannaford 1966:32* (full)
Females more			**NORTH AMERICA** *United States*: Hannaford 1966:32* (elderly)

3.1.1.8. Hospital Utilization (Excluding Pregnancy-Related Utilization)

A limited amount of research has examined hospitalization as a general health/illness indicator. Table 3.1.1.8 indicates that few if any gender differences have been detected.

Table 3.1.1.8. Hospital utilization (excluding pregnancy-related utilization).

Nature of Any Difference					Postpubertal		Multiple Age Categories
					Adolescent	Adult	
More among males						**EUROPE** *Britain*: I Banks 2001;*Spain*: Fernandez et al. 1999; Gonzalez et al. 2005 (colorectal cancer patients re-hospitalized) **LATIN AMERICA** *Brazil*: Barreto et al. 2004 (elderly, urban) **NORTH AMERICA** *United States*: CS Wilder 1964a:15* (elderly); K Hunt et al. 1999 (seek medical treatment in more advanced stages of illness); S Foster & Mallik 1998 (elderly patients with cardiac-related chest pain)	**NORTH AMERICA** *United States*: Rosenstein et al. 1986 (for mental illness)
No signif. difference					**NORTH AMERICA** *United States*: CS Wilder 1964a:15*	**EUROPE** *Netherlands*: Gijsbers van Wijk 1991	
More among females						**NORTH AMERICA** *United States*: CS Wilder 1964a:15* (young & middle age)	

3.1.1.9. Hospital Utilization: Time Spent in the Hospital

A few studies have examined sex differences in the amount of time spent in the hospital among persons who were hospitalized. They have concluded that females do so longer on average than do males (Table 3.1.1.9).

Table 3.1.1.9. Hospital utilization: Time spent in the hospital.

Nature of Any Difference					Postpubertal	
						Adult
Longer among males						
No signif. difference						
Longer among females						**EUROPE** *Britain*: Office of Population Censuses & Surveys 1973 (elderly) **NORTH AMERICA** *United States*: Passman 1966 (elderly); P Cole 1974 (elderly)

3.1.1.10. Chronic Illness

Research pertaining to persons who have been diagnosed with chronic illnesses is cited in Table 3.1.1.10. It suggests that no simple generalization can be made about any gender differences. However, there may be a tendency for males to have more chronic illnesses early in life, and for females to be more afflicted in adulthood.

Table 3.1.1.10. Chronic illness.

Nature of Any Difference	Prepubertal				Postpubertal		Multiple Age Categories
				Childhood	Adolescent	Adult	
More common among males				**EUROPE** *Britain*: Arber & Cooper 2000:127	**NORTH AMERICA** *United States*: CS Wilder 1964a:11*	**EUROPE** *Britain*: C Jarvis & Tinker 1999:610*; *Sweden*: C H Gold et al. 2002* (life threatening illness, elderly)	
No signif. difference				**NORTH AMERICA** *United States*: Van den Bosch et al. 1999			**EUROPE** *Britain*: Arber 1991:427
More common among females						**EUROPE** *Sweden*: CH Gold et al. 2002* (non-life threatening illness, elderly) **LATIN AMERICA** *Brazil*: Barreto et al. 2004:113 (elderly difficulty walking, stooping, etc.) **NORTH AMERICA** *United States*: CS Wilder 1964a:11* (young, middle age, & elderly); Shurtleff 1970; Shurtleff 1974; Verbrugge 1976	**NORTH AMERICA** *Canada*: Walters et al. 2002:687; *United States*: Verbrugge 1982

3.1.1.11a. Self-Reported Degree of Healthiness/Ill Health, Postpubertal Humans

Numerous surveys have asked respondents to rate their health (or ill-health) on some scale (e.g., from 1 to 10). The results of these surveys are summarized in Table 3.1.1.11, which has been split into two age groupings. Regarding postpubertal individuals, Split-Table 3.1.1.11a suggests that males generally consider themselves healthier than females, a conclusion also reached by an earlier review (Reddy et al. 1992). Most of the studies suggesting otherwise were confined to the elderly, where the findings have been quite mixed regarding any gender difference.

Split-Table 3.1.1.11a. Self-reported degree of healthiness/ill health, postpubertal humans.

Nature of Any Difference	Postpubertal		Multiple Age Categories
	Adolescent	Adult	
Males healthier/ less often ill	**EUROPE** *Germany*: Prehler et al. 1992; Siefen et al. 1996 (Greek immigrants); Settertabulte & Kolip 1997; Kirkcaldy et al. 2003:54; *Norway*: Klepp et al. 1996; *Scotland*: Sweeting & West 2003 (young); *Sweden*: Gissler et al. 1999* **NORTH AMERICA** *Canada*: RJ Burke & Weir 1978; *United States*: Gochman 1972; R Burke & Weir 1978; Radius et al. 1980; Sobal et al. 1988; C Alexander 1989; Kowpack 1991; Eiser et al. 1995*; Silverstein & Lynch 1998; Burrow et al. 2004:278 (adoptees, physical health)	**ASIA** *China*: Anson & Sun 2002* **EUROPE** *Britain*: Logan & Brooke 1957; Logan & Cushion 1958; Marmot et al. 1987:113 (long term illness); Annandale & Hunt 1990:35; C Power 1991:413 (young); C Power et al. 1996a; Nazroo 1997:18; Prescott-Clarke & Primatesta 1998:Table 5.14; Arber & Cooper 2000:142 (elderly); H Cooper 2002:698*; Bath 2003 (elderly); Martikainen et al. 2003:720; *Denmark*: Hollnagel & Kamper-Jorgensen 1980; *France*: C Helmer et al. 1999 (elderly); *Germany*: J Smith & M Baltes 1998 (elderly); *Finland*: Kozarevic et al. 1989 (elderly); *Netherlands*: Gijsbers van Wijk et al. 1992; Gijsbers van Wijk et al. 1999; Deeg & Kriegsman 2003 (elderly); *Sweden*: Osterlind et al. 1986 (elderly); Tibblin et al. 1990; Grimby & Wiklund 1994 (elderly); Gissler et al. 1999; L Lundberg et al. 1999:213*; Eriksson et al. 2001; *Several European Countries*: Schroll et al. 1991 (elderly, 11/11 countries) **LATIN AMERICA** *Brazil*: Lima-Costa et al. 2001 (elderly) **MIDDLE EAST** *Israel*: Anson et al. 1993; Prager et al. 1999 (elderly); Benyamini et al. 2003 (elderly); Carmel & Bernstein 2003 (elderly) **NORTH AMERICA** *Canada*: Lindgren et al. 1994 (elderly); M Denton et al. 2004:2593*; *United States*: EC Hammond 1964; US Department of HEW 1973; PJ Bush & Rabin 1976*; Fillenbaum 1979 (elderly); Marcus & Seeman 1981; Verbrugge 1985:161* (young & middle age); Hale et al. 1986 (elderly); Pilpel et al. 1988 (elderly); Anson et al. 1993 (elderly); Arber & Ginn 1993 (elderly); Hamilton & Seidman 1993 (following a heart attack); Seccombe 1993:564 (workers); RF Young & Kahana 1993 (following a heart attack); CE Ross & Bird 1994:172*; Schulz et al. 1994 (elderly); CA Wool & Barsky 1994; Riegel & Gocka 1995 (physical functioning following a heart attack); Mutran et al. 1997:S93 (ages 58-64 employed); Kroenke & Spitzer 1998; JS Levin & Chatters 1998:520 (elderly); Kawachi et al. 1999; Arber & Thomas 2001; McDonough & Walters 2001; Sax et al. 2001 (college); Koertge et al. 2003:1320 (CAD patients); Cleary et al. 2004:44* (ages 25-54, physical health); McCullough & Laurenceau 2004* (young & middle age); H Tabenkin et al. 2004; MP Thompson et al. 2004 (among persons abused as children) **OCEANIA** *Australia*: Parslow et al. 2004; *Philippines*: Lieban 1985	**EUROPE** *Britain*: Furnham & Kirkcaldy 1997; *Germany*: Maschewsky-Schneider et al. 1988; Kirschner et al. 1995 **NORTH AMERICA** *United States*: Leo et al. 1957; GL Maddox 1964; Marcus & Seeman 1981; JS Levin et al. 1995:S160 (Blacks); Safran et al. 1997
No signif. difference	**ASIA** *China*: Anson & Sun 2002* **EUROPE** *Britain*: Eiser et al. 1995a:311* (young); *Finland*: Rahkonen et al. 1997:334; Koivusilta et al. 1998:795 **NORTH AMERICA** *United States*: PJ Bush & Rabin 1976*	**EUROPE** *Britain*: Macintyre et al. 1996; H Cooper 2002:698* (years of education controlled); *Finland*: Aromaa et al. 1989 (elderly); Leinonen et al. 1997* (elderly); Rahkonen et al. 1997:334 (young); *Netherlands*: Deeg & Kriegsman 2003 (elderly); *Norway*: Heikkinen et al. 1997 (elderly); *Sweden*: CH Gold 1997 (opposite sex twins, elderly); Sundquist & Johansson 1997 (elderly); CH Gold et al. 2002 (elderly, opposite sex twins); Molarius & Janson 2002:366 **LATIN AMERICA** *Brazil*: Barreto et al. 2004:113 (elderly) **NORTH AMERICA** *Canada*: M Denton et al. 2004:2593* (after controlling for stress and other psychological factors); *United States*: PJ Bush & Rabin 1976* (young); Verbrugge 1985:161* (elderly); Rakowski et al. 1993 (elderly); CE Ross & Bird 1994:172* (elderly); S Berg 1996 (elderly); Leinonen et al. 1997* (elderly); Arber & Cooper 1999 (elderly); CH Gold et al. 2002 (elderly); Cleary et al. 2004:44* (ages 55-75, physical health); McCullough & Laurenceau 2004* (elderly) **OCEANIA** *Malaysia*: Noor et al. 2003:240 (college, general health questionnaire)	**EUROPE** *Netherlands*: Hartog & Oosterbeek 1998; *Sweden*: RG Brooks et al. 1991:43; L Lundberg et al. 1999:215* (control for income) **NORTH AMERICA** *Canada*: Sadava et al. 2000:558; *United States*: Office of the Assistant Secretary for Health 1979
Females healthier/ less often ill		**NORTH AMERICA** *United States*: Ries 1983 (elderly); Verbrugge & Wingard 1987 (elderly); Mutran & Ferraro 1988 (elderly)	**NORTH AMERICA** *Canada*: Walters et al. 2002:687

3.1.1.11b. Self-Reported Degree of Healthiness/Ill Health, Prepubertal Humans

With regard to children, the few available studies suggest that there is no consistent pattern regarding any sex differences in being healthy or unhealthy (Split-Table 3.1.1.11b).

Split-Table 3.1.1.11b. Self-reported degree of healthiness/ill health, prepubertal humans.

Nature of Any Difference	Prepubertal		
	Toddler	Early Childhood	Childhood
Males healthier/less often ill	**NORTH AMERICA** *United States*: PJ Bush & Rabin 1976* (parent rating)		**NORTH AMERICA** *United States*: CE Lewis & Lewis 1977; R Cohen et al. 1990
No signif. difference		**NORTH AMERICA** *United States*: PJ Bush & Rabin 1976*	
Females healthier/less often ill			**EUROPE** *Sweden*: Gissler et al. 1999*

3.1.1.12. Degree to Which Self-Rated Health Predicts Death

Studies have shown that people who rate their health as poor are more likely to die than those who rate their health as fair, good, or excellent. Two studies have sought to determine if there is a sex difference in this regard, and both concluded that the relationship between self-perceived poor health and probability of death was stronger for males than for females (Table 3.1.1.12).

Table 3.1.1.12. Degree to which self-rated health predicts death.

Nature of Any Difference	Postpubertal
	Adult
More males	**EUROPE** *Netherlands*: Deeg & Kriegsman 2003 (elderly) **INTERNATIONAL** *Multiple Countries*: Idler & Benyamini 1997
No signif. difference	
More females	

3.1.1.13. Correspondence Between Self-Rated Illness and Physician Diagnosis

One study of persons with various cardiovascular ailments assessed the extent to which the sexes might differ in terms of how ill they were relative to a physician's assessment of how ill they were. It concluded that there was a greater correspondence in the case of males (Table 3.1.1.10).

Table 3.1.1.13. Correspondence between self-rated illness and physician diagnosis.

Nature of Any Difference	Postpubertal
	Adult
Greater similarity for males	**NORTH AMERICA** *United States*: R Harris & Weissfeld 1991 (cardiovascular problems)
No signif. difference	
Greater similarity for females	

3.1.1.14. Self-Reported Number of Diseases

Studies in which men and women were asked to self-report the number of diseases they had at a given point in time have shown women reporting a greater average number than men (Table 3.1.1.14).

Table 3.1.1.14. Self-reported number of diseases.

Nature of Any Difference	Postpubertal
	Adult
More by males	
No signif. difference	
More by females	**ASIA** *Thailand*: T Sobieszczyk et al. 2003 (elderly) **LATIN AMERICA** *Multiple Latin American Countries*: A Palloni et al. 2002 (elderly) **NORTH AMERICA** *United States*: L Verbrugge 1985 (elderly); L Verbrugge 1989 (elderly)

3.1.1.15. Being Physically Fit

One study of general physical fitness concluded that males were more physically fit than were females (Table 3.1.1.15).

Table 3.1.1.15. Being physically fit.

Nature of Any Difference						Postpubertal
						Adult
More males						**OCEANA** *New Guinea*: Sinnett & Whyte 1973
No signif. difference						
More females						

3.1.1.16. Relationship Between Social Status and Health

Many studies have found social status is positively correlated with health. According to one study, this relationship seems to be stronger for males than females (Table 3.1.1.16).

Table 3.1.1.16. Relationship between social status and health.

Nature of Any Difference							Multiple Age Categories
More males							**INTERNATIONAL** *Multiple Countries*: Martikainen et al. 2004
No signif. difference							
More females							

3.1.1.17. Carrying Parasites

One study of bats concluded that males carried greater numbers of parasites than did females (Table 3.1.1.17).

Table 3.1.1.17. Carrying parasites.

Nature of Any Difference							Multiple Age Categories
More males							**RODENT** *Bat*: Komeno & Linhares 1999
No signif. difference							
More females							

3.1.2. Mortality and Life Span

Mortality refers to death. Most of the studies to be reviewed under this heading will have to do with death irrespective of cause. The reason is that deaths due to specific diseases are identified under separate sections having to do with each of those specific diseases.

3.1.2.1. Fetal Mortality Rate

All of the available evidence suggests that male fetuses are more likely not to survive to the point of being born alive than is the case for female fetuses (Table 3.1.2.1).

Table. 3.1.2.1. Fetal mortality rate.

Nature of Any Difference	Citations
Higher in males	**ASIA** *Japan*: Mizuno 2000 **EUROPE** *Sweden*: D Hansen et al. 1999 **NORTH AMERICA** *United States*: Hassold et al. 1983; Byrne & Warburton 1987
No signif. difference	
Higher in females	

3.1.2.2. Infant Mortality in General

Mortality during infancy typically refers to death within the first year following birth. Table 3.1.2.2 shows that the findings have been almost evenly split regarding any possible gender difference. However, there is a tendency for most of the studies that have found higher infant mortality rates among males to be Western countries and for most of the countries where females exhibit higher infant mortality rates to be in the Middle East and Southern Asia, especially in rural areas.

Table 3.1.2.2. Infant mortality in general.

Nature of Any Difference	Citations
Higher in males	**ASIA** *China*: Li & Li 1995 (prior to 1980); *Taiwan*: Barclay 1954 (1905-1945); Yang et al. 1996 (1981-1990); *Vietnam*: IE Swenson 1993; Belanger et al. 2003:245 **EUROPE** *Britain*: Office of Population Censuses & Surveys 1973; *Finland*: Xu et al. 1998; *Norway*: Bolander 1984 **MIDDLE EAST** *India*: Bhargava 2003:228; Das Gupta 1987; NU Kelly 1975 **NORTH AMERICA** *United States*: Ciocco 1938a; Ciocco 1938b; Bundesen et al. 1937; Dublin et al. 1949; Knobloch & Pasamanick 1963; S Shapiro et al. 1968; McMillen 1979; National Center for Health Statistics 1980; Naeye & Tafari 1983; Stinson 1985:127; GS Foster et al. 1998:480 (19th Century grave markers); Guest et al. 1998:27 **OCEANIA** *Australia*: Lopez & Ruzicka 1983 **INTERNATIONAL** *Multiple Countries*: SJ Holmes & Goff 1923:236-247; Stolnitz 1956; Fuchs 1975; United Nations 1978
No signif. difference	
Higher in females	**ASIA** *Bangladesh*: Chen et al. 1981 (rural); Koenig & D' Souza 1986 (rural); Bhuiya et al. 1987; Fauveau et al. 1991; *China*: Li & Li 1995 (after 1980); Lai 2005:317 (after 1980) **MIDDLE EAST** *Egypt*: Coale 1991; *India*: Wyon & Gordon 1971 (rural); NU Kelly 1975; BD Miller 1981; Simmons et al. 1982 (rural); Dyson & Moore 1983; Bourne & Walker 1991; Pande 1999 (rural); *Pakistan*: Sather 1987 **OCEANIA** *Sri Lanka*: Arriaga & Way 1988 **INTERNATIONAL** *Multiple Countries*: Hill & Upchruch 1995; *Several Developing Countries*: Sabir & Ebraham 1984; Yount 2001; *Several Middle Eastern Countries*: Waldron 1987 **PRIMATE (EXCEPT APE)** *Macaque*: Dittus 1975; van Schaik & van Noordwijk 1983

3.1.2.3. Infant Mortality Due to Sudden Infant Death Syndrome

Sudden infant death syndrome (SIDS), also known as crib death, refers to the death of an infant less than one year of age without warning or obvious cause. As shown in Table 3.1.2.3, all studies have concluded that male infants are more likely than female infants to succumb to this condition.

Table 3.1.2.3. Infant mortality due to sudden infant death syndrome.

Nature of Any Difference	Citations
Higher in males	**EUROPE** *Northern Ireland*: Froggatt et al. 1971; *Sweden*: Rognum & Willinger 1995 **NORTH AMERICA** *United States*: Mage 1996; Mage & Donner 1996; Kukolich et al. 1977; Mage & Donner 1997; PJ Schwartz et al. 2000; Mage & Donner 2004 **OCEANIA** *New Zealand*: EA Mitchell & Stewart 1997; EA Mitchell & Thompson 2001:421 **INTERNATIONAL** *Several Industrial Countries*: Mage & Donner 2004:1211
No signif. difference	
Higher in females	

3.1.2.4. Childhood Mortality

Childhood mortality refers to death sometime between the end of infancy and the onset of puberty. In the delineation of age categories used in this book, the age range for childhood covers toddlers, preschoolers, and school aged children. As shown in Table 3.1.2.4, inconsistent results have appeared in the literature regarding any gender differences in childhood mortality, although as mentioned in regard to infant mortality, most of the countries with higher female than male childhood mortality are in the Middle East and Southern Asia.

Table 3.1.2.4. Childhood mortality.

Nature of Any Difference	Citations
Higher in males	**AFRICA** *Somalia*: Harpending & Pennington 1981 (Herero pastoralists) **ASIA** *Taiwan*: NE Williamson 1976; Department of Statistics 1992; **EUROPE** *Britain*: SJ Holmes 1926* (toddler); *Germany*: Rauber 1900 (toddler); Kemkes-Grottenthaler 2004 (17th and 18th Century) **NORTH AMERICA** *United States*: SJ Holmes & Goff 1923 (toddler); SJ Holmes 1926* (toddler); A Scheinfeld 1944:64 (toddler) **INTERNATIONAL** *Multiple Countries*: Bakwin 1929 (toddler); Chile, Japan, Germany, Denmark, New Zealand, & US) **BIRD** *Finch*: PM Nolan et al. 1998; *Grackle*: Howe 1977; *Gull*: R Griffiths 1992
No signif. difference	
Higher in females	**ASIA** *Bangladesh*: Chen et al. 1981 (school age); Bairagi 1986 (during famine); *China*: Arnold & Zhaoxiang 1986; Xu et al. 1994 (toddler); Yu & Sarri 1997 (toddler) **NORTH AMERICA** *United States*: E Smith & Smith 1994 (Alaska Inuit) **MIDDLE EAST** *India*: Padmanabha 1982 (toddler); Das Gupta 1987 (toddler, Punjab province); Malhi et al. 1991; Kishor 1995 (toddler); Bhargava 2003:228; *Pakistan*: Alderman & Gertler 1997 (school age); Hazarika 2000 (school age) **INTERNATIONAL** *Multiple Countries*: Croll 2000 (several Asian countries, school age)

3.1.2.5. Mortality for Adolescents and Adults

Studies that have compared the mortality rates of male and female adolescents and adults have largely concluded that the rates among males are higher than those among females (Table 3.1.2.5).

Table 3.1.2.5. Mortality for adolescents and adults.

Nature of Any Difference		Postpubertal		Multiple Age Categories
		Adolescent	Adult	
Higher in males		**EUROPE** *Germany*: Kemkes-Grottenthaler 2004:141 (in 17th & 18th Century) **NORTH AMERICA** *United States*: Sweeting 1995; National Center for Health Statistics 1996; Kann et al. 1993; Van Camp et al. 1995 (among high school athletes, sudden death from exercise)	**EUROPE** *Britain*: J Smith & Harding 1997 **NORTH AMERICA** *United States*: Enterline 1961 (due to cardiovascular disease); SH Preston 1970 (due to cardiovascular disease); Wingard 1982 (White); Wingard et al. 1983 (White)	**NORTH AMERICA** *United States*: Madigan 1957 (among opposite sex siblings); Enterline 1961; A Damon 1964 **INTERNATIONAL** *Multiple Countries*: Fuchs 1975
No signif. difference			**NORTH AMERICA** *United States*: Syme & Guralnik 1987 (due to cardiovascular disease)	
Higher in females			**OCEANIA** *Australia*: *Australian* Bureau of Statistics 2003	

3.1.2.6a. Life Expectancy (Life Span, Age of Death) for Humans

A tremendous number of studies from diverse parts of the world have assessed life expectancy by simply subtracting one's year of birth from his/her year of death. As shown in Table 3.1.2.6a, the vast majority of these studies have concluded that females live longer than do males. Nearly all of the exceptions either pertain to persons living in southern Asia or to those living in Western countries two or more centuries ago. The sex difference in life expectancy in developing countries is 4-10 years favoring females (Nathanson 1984:192). Sex differences in industrialized countries have been in the range of 5-7 years in recent decades.

It is worth noting that life expectancy is the only major health and illness indicator that generally suggests that among adults females are healthier than males. This brought one author to proclaim, "Women get sick, men die" (Nathanson 1977).

Table 3.1.2.6a. Life expectancy (life span, age of death) for humans.

Nature of Any Difference	Average Years of Life
Males live longer	**AFRICA** *Parts of Northern Africa*: MacDonnel 1913:376 (~50 AD) **ASIA** *Nepal*: JL Allen 1999:125* **MIDDLE EAST** *India*: Ram 1993:89 (less than one year difference); *Multiple Countries*: El-Badry 1969 **EUROPE** *Britain*: Davey Smith et al. 1992; Gunnell et al. 2001:506 (9th through 18th Centuries, inscriptions of ancient headstones); *Rome*: MacDonell 1913:370; *Germany*: Kemkes-Grottenthaler 2004:141* (17th Century) **NORTH AMERICA** *United States*: Kunitz 1984 (17th Century); Hanna et al. 1992 (among heavy drinkers) **INTERNATIONAL** *Multiple Countries*: Hishinuma 1976 (Greece: 3500-150 BC, Ancient Rome, Hungary: Middle Ages)
No signif difference	**ASIA** *Bangladesh*: SM Ahmed et al. 2000:362 **MIDDLE EAST** *India*: P Griffiths et al. 2000:487 **NORTH AMERICA** *United States*: GS Foster & Hummel 1995:100
Females live longer	**AFRICA** *Parts of North Africa*: Macdonell 1913:376 (circa 50AD); Mwabu 2001; *Mauritius*: Bah 1998; *South Africa*: Sender 1999:91 **ASIA** *China*: Yi et al. 2003; *Former Soviet Union*: Krupnik 1985 (Siberian hunter-gatherers); K Katz 2001:5.4; *Japan*: MH Qureshi et al. 1995*; *Russia*: M Ryan 1995; *Thailand*: TD Fuller et al. 1993 **EUROPE** *Britain*: Herdan 1952:365 (1840-1945); R Woods & Smith 1983:220 (19th Century); Central Statistical Office 1987; MH Qureshi et al. 1995*; S Harding & Balarajan 1996:1391; Smith & Harding 1997; Bird & Pieker 1999; Dunnell & Fitzpatrick 1999; L Harrison & Gardiner 1999; *Finland*: Koskinen & Martelin 1994; Koskinen et al. 1995; *France*: Bourgeois-Pichat 1965 (18th Century); Garros & Bouvier 1978; *Germany*: Kemkes-Grottenthaler 2004:141 (18th Century); *Italy*: Macdonell 1913:370 (Rome circa 50AD); *Lithuania*: Kalediene & Petrauskiene 2000:6; *Netherlands*: Gijsbers van Wijk et al. 1992; van Rossum et al. 2000; *Poland*: GU Statysfyczny 1992; Adamchik & Bedi 2003:699; *Scotland*: Davey Smith et al. 1992 (19th Century); MH Qureshi et al. 1995*; Marang-van de Mheen et al. 2001; Whalley & Deary 2001:2; *Sweden*: Statistics Sweden 1969; Stefansson 1991; Lundin & Sundstrom 1994; Hemstrom 1996a; Hemstrom 1999; Statistics Sweden 2000; Bardage et al. 2001:18 (twins); *Several European Countries*: Herdan 1952 (18th & 19th Centuries); Peller 1965:95 (15th & 16th Centuries); N Hart 1989; Valkonen & Van Poppel 1997 (Scandinavia and Netherlands); EA Wrigley 1969 (19th Century); Stini 2003:25 **LATIN AMERICA** *Brazil*: Martin & Freitas 2002; Barreto et al. 2004; *Columbia*: Zaldivar et al. 1991:490 (Bari); *Mexico*: Population Reference Bureau 1993 (1950-1993) **NORTH AMERICA** *Canada*: Millar 1983; Canadian Ministry of Supply & Services 1985; Gee & Veevers 1988; *United States*: Dublin 1923:79; Sydenstricker 1929; Dublin & Lotka 1936:65; Wiehl 1939:149; Ciocco 1940; LC Coombs 1941 (Whites); A Scheinfeld 1944:166 & 190; Metropolitan Life Insurance Company 1949; Mayer & Hauser 1953; Yeracaris 1955; JM Ellis 1957 (Whites); Madigan 1957; Tayback 1957; Scheinfeld 1958; Enterline 1961; Stockwell 1963 (Whites); EC Hammond 1966; Grove & Hetzel 1968; Hollingsworth 1969 (19th and first half of 20th century); Kitagawa & Hauser 1973; Metropolitan Life Insurance Company 1974; Keyfitz 1975; Nathanson 1975; SH Preston 1976; Verbrugge 1976; Verbrugge 1976b; MR Haines 1977; A Johnson 1977a; Nathanson 1978; MR Haines 1979; Ortmeyer 1979; Morgenstern 1980:192; Verbrugge 1980; Crimmins 1981; Waldron 1982:73; Wingard 1982 (non-smokers); Gee & Veevers 1983; MM McMillen & Rosenberg 1983; Waldron 1983; WR Hazzard 1984; Lopez 1984; Wingard 1984; Wylie 1984 (elderly); Verbrugge 1985:158; Waldron 1986 (smoking); Holden 1987; U S Bureau of the Census 1987 (females live an average of 7 years longer); Metropolitan Life Insurance Company 1988; Centers for Disease Control 1987; Halpern & Coren 1991 LR Carter & Lee 1992:395; National Center for Health Statistics 1992; National Center for Health Stats 1993 (1990); S Goldstein 1996:81 (Jews); Guest et al. 1998:27; GS Foster et al. 1998:480 (grave markers 19th Century); Hemstrom 1998; Arber & Cooper 1999; Calle et al. 1999; Hummer et al. 1999:278; L Ellis & Engh 2000:564; MD Hayward et al. 2000:920; SL Murphy 2000; Noymer & Garenne 2000:569; RD Rogers et al. 2000 (non-smokers); Arber & Thomas 2001 **OCEANIA** *Australia*: Australian Institute of Health & Welfare 1996; Korten et al. 1999; Yu et al. 2000:366; *New Zealand*: TE Moffitt et al. 2001:19 **INTERNATIONAL** *Several Industrial Countries*: Dublin & Lotka 1936:48; Spiegelman & Erhardt 1974 (18 out of 18 countries); Retherford 1975:46; Nathanson 1977:14; Waldron 1982:98; Kisker & Goldman 1987:138; Waldron 1993; Nathanson 1995; Trovato & Lalu 1996 (12 industrial countries); Trovato & Lalu 1998:3 (7 countries); *Multiple Muslim Countries*: Weisfeld 1993:82 (Muslim countries) *Multiple Countries*: Stolnitz 1955 (between 1850 & 1950); Stolnitz 1956; Thomlinson 1965; TH Hollingsworth 1969; Preston 1970; Fuchs 1975; Stolnitz 1975; United Nations 1982; AD Lopez 1983; AD Lopez 1984; Stolnitz 1987; UN Population Division 1987; United Nations 1988; Waldron 1993; Trovato & Lalu 1996:25 (38 countries); Nikiforov & Mamaev 1998; Trovato & Lalu 1998*; JL Allen 1999:125 (156/157 countries in the last quarter of the 20th century); Mackenbach et al. 1999:1804 (7/7 countries); Guralnik et al. 2000:75; World Health Organization 2000 (Iceland, Israel, Russia); IPF Owens 2002; Pampel 2002; *Developed Countries*: United Nations 1988; I Waldron 1993; *Soviet Block Countries*: Leon et al. 1997; Chenet 2000:185 & 189

3.1.2.6b. Trends in Life Expectancy for Humans

According to one study involving multiple countries, the gap between the sexes in life expectancy rose substantially between 1940 through 1970, but thereafter began to level off and even decline in the 1980s, although females were still living about 6 years longer on average than males in 1990 (Table 3.1.2.6b).

Table 3.1.2.6b. Life expectancy for non-humans.

Nature of Any Difference	Citations
Increase in the sex difference	**INTERNATIONAL** *Multiple Countries*: Trovato & Lalu 1998:3* (1940-1970)
No significant change	**INTERNATIONAL** *Multiple Countries*: Trovato & Lalu 1998:3* (1970-1980)
Decrease in the sex difference	**INTERNATIONAL** *Multiple Countries*: Trovato & Lalu 1998:3* (1980-1990)

3.1.2.6c. Life Expectancy for Non-Humans

A considerable number of life expectancy studies have also been published on various species of nonhumans. As shown in Table 3.1.2.6c, a pattern similar to that among humans is evident. In the majority of species, females have a tendency to live longer than males. This supports a conclusion based on a smaller sample of species by JB Hamilton and Mestler (1969:395).

Table 3.1.2.6c. Life expectancy for non-humans.

Nature of Any Dif-ference	Citations
Males live longer	**BIRD** *Finch*: E Eisner 1967; *Pigeon*: WM Levi 1953; *Quail*: GL Daniels 1968; VD Kohler 1981 **FISH** *Cardinalfish*: Okuda 1999 **INVERTEBRATE** *Fly*: RR Hyde 1913 (40 versus 35 days); Lutz 1915 (36 v. 29 days)
No signif. difference	**BIRD** *Pigeon*: LJ Cole & Kirkpatrick 1915:472 **INVERTEBRATE** *Fly*: R Pearl & Parker 1921:498 **PRIMATE (EXCEPT APE)** *Redfronted Lemur*: Ostner & Kappeler 2004
Females live longer	**ARACHNID** *Black Widow*: Blair 1934; Herms et al. 1935; Deevey & Deevey 1945:120; *Spider*: T Montgomery 1903; Bonnet 1929 (*Nephila Madagascariensis*); Bonnet 1930 (*Nephila Madagascariensis*); Bishopp & C Smith 1938; Deevey & Deevey 1945 **BIRD** *Chicks*: W Landauer & A Landauer 1931; *Grackle*: Selander 1966; *Pheasants*: R Thomas & J Huxley 1927 **CRUSTACEANS** *Spinax Niger*: R Punnett 1904; Blegvad 1922; J MacArthur & Baillie 1929 **INVERTEBRATE** *Beetle*: S Hein 1920; *Drosophila*: Pearl & Parker 1924*; Pearl & Miner 1935; *Flies*: R Pearl 1922; R Pearl & S Parker 1924*; J Gowen 1931; *Flour Beetle*: Pearl et al. 1941; *Mealworms*: Hein 1920:244 *Moth*: Graf 1917 (multiple species); Rau & Rau 1914:6* (Satarnid moth) **MAMMAL** *Elephant Seal*: LeBoeuf 1974 **RODENT** *Rat*: Robertson et al. 1934; C Reich & W Dunning 1941; C McCay et al. 1943; A Carlson & Hoelzel 1946; Schlettwein-Gsell 1970; CL Goodrick 1980 **UNGULATE** *Cattle*: F Jewell 1921; *Deer*: Robinette et al. 1957; *Sheep*: Grubb 1974

3.1.2.7. Relationship Between Mortality and Self-Rated Health

Studies have shown that people who report their health as poor are more likely to die then those who rate than health as good (e.g., Mossey & Shapiro 1982). This tendency may be slightly stronger in males than in females (Table 3.1.2.7).

Table 3.1.2.8. Relationship between mortality and self-reported health.

Nature of Any Dif-ference	Postpubertal
	Adult
Stronger for males	**EUROPE** *Britain*: Spiers et al. 2003*(strong predictor of survival); Spiers et al. 2003*(report life threatening health problems); *Netherlands*: Deeg & Kriegsman 2003 (elderly)
No signif. difference	**EUROPE** *Britain*: PA Bath 2003 (elderly)
Stronger for females	**EUROPE** *Britain*: Spiers et al. 2003*(disabling but not life threatening health problems)

3.1.2.8. Relationship Between Mortality and Social Status

Numerous studies have found that persons of high social status live longer on average than do those of low status (which is also true for health in general – see below). Table 3.1.2.8 shows that one study reported that the relationship between social status and life expectancy was stronger in the case of males than females.

Table 3.1.2.8. Relationship between mortality and social status.

Nature of Any Difference	Citation
Stronger for males	**EUROPE** *Britain*: Koskinen & Martelin 1994; *Poland*: Welon et al. 1999 (educational level)
No signif. difference	
Stronger for females	

3.1.2.9. Relationship between Mortality and Marriage

On average, persons who are married live longer than do persons who are single, divorced, or widowed. According to Table 3.1.2.9, this tendency is more pronounced in the case of males than females.

Table 3.1.2.9. Relationship between mortality and marriage.

Nature of Any Difference	Citations
Stronger for males	**NORTH AMERICA** *United States*: Gove 1973; Kobrin & Hendershot 1977; Berkman & Syme 1979; Helsing et al. 1981; Blazer 1982 (elderly); JS House et al. 1982; House et al. 1988
No signif. difference	
Stronger for females	

3.1.2.10. Relationship Between Health and Social Status

A large number of studies have revealed that persons of high social status outlive those who are of low status (reviewed by L Ellis 1994 through the early 1990s). According to two of these studies, this tendency is true to a greater degree for males than for females (Table 3.1.2.10).

Table 3.1.2.11. Relationship between health and social status.

Nature of Any Difference	Citations
Stronger for males	**EUROPE** *Britain*: Yuen et al. 1990 (adult); Stronks et al. 1995 (adult)
No signif. difference	
Stronger for females	

3.1.2.11. Relationship Between Health and Hours Worked Per Week

According to one investigation, males exhibit a stronger positive relationship between number of hours worked per week and tendencies to have good health (Table 3.1.2.11). In fact, among females, those who worked fewer hours per week exhibited better health than those who worked more than 40 hours per week.

Table 3.1.2.11. Relationship between health and hours worked per week.

Nature of Any Difference	Citations
Stronger for males	**NORTH AMERICA** *United States*: Stolzenberg 2001
No signif. difference	
Stronger for females	

3.1.2.12. Variability in Age of Death

Males appear to exhibit a greater degree of variation in their life expectancy than do females (Table 3.1.2.12).

Table 3.1.2.12. Variability in age of death.

Nature of Any Difference			Multiple Age Categories
More in males			**EUROPE** *Finland*: Koskinen & Martelin 1994 **INTERNATIONAL** *Multiple Countries*: Mackenbach et al. 1999:1801
No signif. difference			
More in females			

3.1.2.13. Location of Death

One study of the location in which people died concluded that males were more likely to die in the home, and females were more likely to do so in a hospice facility (Table 3.1.2.13).

Table 3.1.2.13. Location of death.

Nature of Any Difference				Multiple Age Categories
More in males				**EUROPE** *Britain*: D Field et al. 1997:10* (home)
No signif. difference				
More in females				**EUROPE** *Britain*: D Field et al. 1997:10* (hospice facilities)

3.2
SPECIFIC ILLNESSES AND INJURIES

Gender differences in illnesses are usually characterized in terms of one or more of four factors: consultation, diagnosis, death, and survival. *Consultation* has to do with seeking professional help for an illness (or symptom of illness). *Diagnosis* refers to a qualified health practitioner declaring that someone has a specific disease. Of course, *death* (or mortality) from a specific disease means that this disease was considered the main cause of someone’s dying. *Failure to survive* (the opposite of *survive*) means that affected individuals failed to live for a specified period of time (often at least five years) beyond the point of diagnosis.

3.2.1. Accidental Injuries/Fatalities

Accidental injuries and fatalities typically result from a sudden environmental insult on the body, such as that caused by a sudden blow from a heavy, sharp, or speeding object. Other accidental injuries are caused by exposure to fire, water, or manmade chemicals. The findings on sex differences in rates of accidental injuries are discussed in the following five tables.

3.2.1.1. Accidental Injuries/Fatalities in General

Many studies have reported on gender differences in accidental injury rates in general. As one can see in Table 3.2.1.1, nearly all studies have concluded that among persons of all ages (with the possible exception of the elderly) males sustain higher rates of injuries than do females. Interestingly, studies of nonhumans – also shown in this table – have reported higher rates of injury probabilities among males than females as well.

Table 3.2.1.1. Accidental injuries/fatalities in general.

Nature of the Difference	Sub-adolescent				Postpubertal		Multiple Age Categories
	Infant	Toddler	Early Childhood	Childhood	Adolescent	Adult	
More among males	**INTERNATIONAL** *Several Industrial Countries*: Mage & Donner 2004:1211 (die from drowning)	**NORTH AMERICA** *United States*: National Center for Helath Statistics 1994* (death)	**NORTH AMERICA** *United States*: JH Powers & Lincoln 1953; JWB Douglas & Blomfield 1956; National Center for Health Statistics 1994* (toddler); National Center for Health Statistics 1994* (death)	**EUROPE** *Germany*: Eibl-Eibesfeldt 1989:271; *Sweden*: Engstrom 2002* (fatal) **NORTH AMERICA** *Canada*: Bienefeld et al. 1996; MA King et al. 1998; *United States*: CS Wilder 1964:9*; ML Bauer 1967*; Sibert et al. 1981; SP Baker et al. 1984*; Matheny & Fisher 1984; Guyer & Ellers 1990; Center for Disease Control 1992; National Center for Health Statistics 1994* (fatal); Scheidt et al. 1995 **INTERNATIONAL** *Multiple Countries*: AJC King et al. 1996	**EUROPE** *Britain*: AJ Chapman et al. 1980; *Sweden*: Engstrom 2002* (fatal) **NORTH AMERICA** *United States*: CS Wilder 1964:9*; ML Bauer 1967:7*; Hing & Cypress 1978:5*; SP Baker et al. 1984*; National Center for Health Statistics 1994* (fetal); J Arnett 1995; Grunbaum et al. 1998:155 **INTERNATIONAL** *Multiple countries*: Trovato & Lalu 1998:14* (seven countries) **PRIMATE (EXCEPT APE)** *Howler Monkey*: TR Pope 1990:444	**EUROPE** *Britain*: Dunnell et al. 1999; *Finland*: Koskinen & Martelin 1994:1392; Martikainen 1995:365 **NORTH AMERICA** *United States*: CS Wilder 1964b:9* (young & middle age); ML Bauer 1967:7* (young & full); Hing & Cypress 1978:5* (young); SP Baker et al. 1984*; Veevers & Gee 1986; US Census Bureau 1994:96; National Center for Health Statistics 1994* (death) **INTERNATIONAL** *Industrial Countries*: Pampel 2001:411 *Multiple Countries*: Trovato & Lalu 1998:14* (7/7 countries) **PRIMATE (EXCEPT APE)** *Baboon*: C Drews 1996 (fighting induced injuries) **RODENT** *Meadow Vole*: Boonstra & Boag 1992 (injuries/wounds mainly due to fighting)	**AFRICA** *South Africa*: Lerer 1992:95 **EUROPE** *Britain*: L Shaw & Sichel 1971; D Field et al. 1997:2* (fatal) **NORTH AMERICA** *Canada*: Statistics Canada 1971 (diagnosed); Brison & Pickett 1992 (accidental injuries, rural, non-fatal); SK Young 1995 (rural, non-fatal); Voaklander et al. 1999 (rural, diagnosis); Walters et al. 2000:687; Dimich-Ward et al. 2004 (rural, diagnosed and death from accidental injuries); *United States*: RC Peck et al. 1965; CS Wilder 1965:9; CS Wilder 1969:5; GV Graham 1970:5; A Johnson 1977a:31; National Safety Council 1982 (rural, death from accidental injuries); Waldrow 1982:73 (fatal); Verbrugge 1985:158 (fatal); Rockett & Smith 1989; Gunderson et al. 1990 (accidental injuries, rural, diagnosis); DJ Murphy et al. 1990 (rural, diagnosis); Etherton et al. 1991 (death, farm machinery); Cerrelli 1992; Cherpitel 1993; JR Myers & Hard 1995 (rural, death from accidental injuries); Nordstrom et al. 1995 (accidental injuries, rural, diagnosed); Simon & Corbett 1996; Rivara 1997 (rural, non-fatal); Udry 1998; Retting et al. 1999:691; Bergdahl & Norris 2002:289 **OCEANIA** *Australia*: Yu et al. 2000:366; *New Zealand*: AH Smith & Pearce 1984 **PRIMATE (EXCEPT APE)** *Macaque*: Whitten & Smith 1984 (forequarter wounds); *Spider Monkey*: CR Carpenter 1935 **INTERNATIONAL** *Multiple Countries*: World Health Organization 1968 (hospitalization); World Health Organization 1975 (children, diagnosed)
No signif. diff.	**EUROPE** *Britain*: D Field et al. 1997:2* (death)					**EUROPE** *Britain*: D Field et al. 1997:2* (elderly, death) **NORTH AMERICA** *United States*: Hing & Cypress 1978:5*	**EUROPE** *Netherlands*: Lourens et al. 1999
More among females							

3.2.1.2. Motor Vehicle Accident Injury/Fatality

Some studies have focused exclusively on accidental injuries and fatalities resulting from motor vehicle collisions, the largest single cause of serious injuries in most industrial societies. These studies frequently attempt to adjust for varying degrees of risk by adjusting for the total number of miles driven. As shown in Table 3.2.1.2, studies of adolescents have concluded that males are at higher risk of being injured or killed. However, virtually no differences have been found among adults, especially after making adjustments for total miles driven.

Table 3.2.1.2. Motor vehicle accident injury/fatality.

Nature of Any Difference	Postpubertal		Multiple Age Categories
	Adolescent	Adult	
More in males	**EUROPE** *Spain*: Claret et al. 2003* (crude & adjusted) **NORTH AMERICA** *United States*: Massie et al. 1994*; Stamatiadis & Decon 1995*; Li et al. 1998*; Ryan et al. 1998*; Kramarow et al. 1999	**AFRICA** *Ethiopia*: Dessie & Larson 1991	**ASIA** *Nigeria*: Jinadu 1994; *Thailand*: Swaddiwudhipong et al. 1994 **AFRICA** *Ghana*: Mock et al. 1999 **EUROPE** *Spain*: Ferrando et al. 1998 **MIDDLE EAST** *Iran*: Roudsari et al. 2004 **NORTH AMERICA** *United States*: Veevers 1982; Taket 1986; Center for Disease Control 1987; Rockett & Smith 1989; National Highway Traffic Safety Administration 1994; Dobson et al. 1999; Waldron 2000:163; Tavris et al. 2001
No signif. difference		**EUROPE** *Spain*: Claret et al. 2003* (adjusted) **NORTH AMERICA** *United States*: Stamatiadis & Deacon 1995*; Li et al. 1998*; Ryan et al. 1998*	
More in females		**EUROPE** *Spain*: Claret et al. 2003* (crude)	

3.2.1.3. Accidental Injuries/Fatalities From Burns

All of the available research on accidental injuries due to burns has concluded that males have higher risks than do females (Table 3.2.1.3).

Table 3.2.1.3. Accidental injuries/fatalities from burns.

Nature of Any Difference	Prepubertal	Postpubertal
	Childhood	Adult
More males	**NORTH AMERICA** *United States*: Barrow & Herndon 1990 (fatal)	**NORTH AMERICA** *United States*: Vico & Papillon 1992; Muller et al. 2001; O'Keefe et al. 2001; McGwin et al. 2002 (elderly)
No signif. difference		
More females		

3.2.1.4. Sports-Related Injuries

The few available studies pertaining to sports-related injuries have all concluded that there is no significant gender difference (Table 3.2.1.4).

Table 3.2.1.4. Sports-related injuries.

Nature of Any Difference	Postpubertal
	Adult
More males	
No signif. difference	**MIDDLE EAST** *Turkey*: GD McKay et al. 2001 (college, basketball players); Sallis et al. 2001; Dane et al. 2004 (college, physical education)
More females	

3.2.1.5. Bone Fractures/Broken Bones

Studies of bone fractures and accidental injuries resulting from falls are most common among the elderly. The majority of studies have concluded that females are more likely than males to suffer from such injuries (Table 3.2.1.5).

Table 3.2.1.1. Bone fractures/broken bones.

Nature of the Relationship	Prepubertal	Postpubertal		Multiple Age Categories
	Toddler	Adolescent	Adult	
More among males	**EUROPE** *Sweden*: Hedlund & Lindgren 1986 (femoral shaft fracture)			**PRIMATE (EXCEPT APE)** *Rhesus Macaque*: Buikstra 1975
No signif. difference			**MIDDLE EAST** *Israel:* D Lieberman & D. Lieberman 2004* (mortality after hip fracture surgery among elderly); D Lieberman & D. Lieberman 2004* (anatomical site of hip fracture among elderly); D Lieberman & D. Lieberman 2004* (functional independence prior to hip fracture elderly) **NORTH AMERICA** *United States*: Magaziner et al. 1990 (elderly, recovery from hip fractures); Koval et al. 1998 (elderly, recovery from hip fractures) **OCEANIA** *Japan*: Kitamura et al. 1998 (elderly, recovery from hip fractures)	
More among females		**EUROPE** *Finland*: Salminen et al. 1997* (femoral shaft fracture)	**ASIA** *Taiwan*: Tsai et al. 1996 (vertebrae fractures) **EUROPE** *Britain*: JR Center et al. 1999 (elderly, osteoporosis-related); *Finland*: Salminen et al. 1997* (femoral shaft fracture); Kannus 1999 (elderly, fall-related); *Netherlands*: Kempen et al. 2003 (elderly, slower recovery from arm/leg fractures); *Sweden*: Bengner et al. 1990 (elderly, femoral shaft fracture) **NORTH AMERICA** *United States*: Hing & Cypress 1978:5* (elderly); Hedlund et al. 1986 (femoral shaft fracture); Arneson et al. 1988 (femoral shaft fracture); Silverman & Madison 1988 (elderly, hip fractures); Tinetti et al. 1988; AJ Campbell et al. 1990 (elderly); Grisso et al. 1990 (elderly); Kellie & Brody 1990 (elderly, hip fractures); Sattin et al. 1990 (elderly); C Cooper et al. 1992 (vertebrae fractures); MR Griffin et al. 1992 (elderly, hip fractures); Hinton & Smith 1993 (elderly, femoral shaft fracture); Lauritzen et al. 1993 (elderly); Greenspan et al. 1994 (elderly); G Jones et al. 1994a (elderly); G Jones et al. 1994b (elderly); KM Davies et al. 1996 (vertebra fractures); Burger et al. 1997; Tinetti & Williams 1997; Y Young et al. 1997 (elderly, faster recovery from hip fractures); Center for Disease Control 1999 (elderly, injury);Ytterstad 1999 (elderly); DeLaet et al. 2000 (vertebra fractures); Kanis et al. 2000 (elderly, due to osteoporosis); AA Ellis & Trent 2001 (elderly, fall-related); Murtagh & Hubert 2004 (elderly, bone fractures in general); JA Stevens & Sogolow 2005:116 (elderly, fall-related) **OCEANIA** *Australia*: Center et al. 1999:880 (elderly, sustaining bone fractures, fatal); Peel 2002 (elderly, fall-related); *New Zealand*: AJ Campbell et al. 1990 (elderly, fall-related)	

3.2.1.6. Dislocated Hip

Dislocation of the hip occurs when the ball of the femur (thigh) bone has slipped out of the hip socket. According to the two studies shown in Table 3.2.1.6, the condition is more common in females than in males.

Table 3.2.1.6. Dislocated hip.

Nature of Any Difference	Postpubertal
	Adult
More males	
No signif. difference	
More females	**NORTH AMERICA** *United States*: A Damon 1964 (diagnosed); Myrianthopoulos & Chung 1974 (diagnosed)

3.2.1.7. Repetitive Strain Injuries

According to one study, females experience more repetitive strain injuries than is the case for males (Table 3.2.1.7).

Table 3.2.1.7. Repetitive strain injuries.

Nature of Any Difference	Multiple Age Categories
More males	
No signif. difference	
More females	**NORTH AMERICA** *Canada*: Cole et al. 2005 (at work, ages 18-64)

3.2.1.8. Spinal Cord Injuries

One study of spinal cord injuries among humans concluded that it was more common among men than among women (Table 3.2.1.8).

Table 3.2.1.8. Spinal cord injuries.

Nature of Any Difference	Postpubertal
	Adult
More males	**NORTH AMERICA** *United States*: Schwab & Bartholdi 1996 (diagnosis)
No signif. difference	
More females	

3.2.2. Congenital Illnesses

Congenital illnesses are of numerous types, and they range from those that are merely cosmetic to others that are usually lethal. By definition, all of these diseases are present at birth, although they may not always be diagnosed until later in life.

3.2.2.1. Congenital/Genetic Malformations (Birth Defects) in General

Both studies that provided an estimate of gender differences in congenital malformations concluded that these malformations were more common among males than among females (Table 3.2.2.1).

Table 3.2.2.1. Congenital/genetic malformations (birth defects) in general.

Nature of Any Difference	Citations
More in males	**ASIA** *India*: Bajpayee et al. 2002 (genetic damage to lymphocytes) **NORTH AMERICA** *United States*: Lary & Paulozzi 2001 (diagnosed)
No signif. difference	
More in females	

3.2.2.2. Alobar Holoprosencephaly

The failure of the proencephalon (the forebrain of an embryo) to divide bilaterally and form the cerebral hemispheres is known as *holoprosencephaly*. Infants who suffer this affliction have a poor prognosis for physical and mental development. This disorder is the result of a combination of genetic and environmental factors and is treated according to the symptoms experienced. One study of this rare condition found most of its victims to be female (Table 3.2.2.2).

Table 3.2.2.2. Alobar holoprosencephaly.

Nature of Any Difference	Citations
More in males	
No signif. difference	
More in females	**NORTH AMERICA** *United States*: Roach et al. 1975

3.2.2.3. Anal Atresia (With or Without Fistula)

Anal Atresia is the absence, misplacement, or constriction of the rectum or anus. This disorder is thought to be associated with the chromosomal abnormality known as Trisomy 18. Trisomy 18 is the addition of a third chromosome to what is normally only two such chromosomes.

The prevalence of this disorder is between 1.4 (Haeusler et al., 2002) and 5.2 (Stoll et al., 1996) per 10,000 births. As shown in Table 3.2.2.3, most studies have found this disorder to be significantly more prevalent among males than among females.

Table 3.2.2.3. Anal atresia (with or without fistula).

Nature of Any Difference	Citations
More in males	**ASIA** *China*: M Myers et al. 2001 **EUROPE** *France*: J Harris et al. 1995; *Several European Countries*: Cuschieri 2001; Haeusler et al. 2002 **NORTH AMERICA** *United States*: Kiesewetter et al. 1964 (diagnosed); Spouge & Baird 1986; Lary & Paulozzi 2001 **OCEANIA** *Australia*: MM Riley et al. 1998
No significant difference	**EUROPE** *France*: Stoll et al. 1997 **NORTH AMERICA** *United States*: Yang et al. 1994
More in females	

3.2.2.4. Anencephaly

A congenital brain defect in which a part of the cerebral hemisphere is missing or greatly underdeveloped is known as anencephaly. The disorder is the result of a failure of the neural tube to complete closure and occurs in approximately 1 of every 1,000 pregnancies. In the most extreme cases, major portions of the brain and the top part of the skull are never formed leaving the embryo to develop with regions of the brain exposed. According to the one identified study of anencephaly and gender, this condition is more common among females (Table 3.2.2.4).

Table 3.2.2.4. Anencephaly.

Nature of Any Difference	Citations
More in males	
No significant difference	
More in females	**NORTH AMERICA** *United States*: A Stevenson et al. 1966 (diagnosed)

3.2.2.5. Aortic Valve Atresia

Atresia (absence or closure of) of the heart’s aortic valve is characterized by an aortic orifice, which causes the blood to flow from the pulmonary valve to the aorta. According to the available study, this condition is more prevalent among males than among females (Table 3.2.2.5).

Table 3.2.2.5. Aortic valve atresia.

Nature of Any Difference	Citations
More in males	**NORTH AMERICA** *United States*: Fontana & Edwards 1962 (diagnosed)
No signif. difference	
More in females	

3.2.2.6. Atrial Septal Defect

An abnormal hole in the septum between the right and left atria that allows oxygenated (red) blood to mix with oxygen depleted (blue) blood in the right atrium is known as an atrial septal defect. This condition results in increased blood flow to the right ventricle and lungs creating extra work for both the heart and lungs. Enlargement of the right ventricle can occur due to this burden, and the additional blood flow can cause damage to the vessels of the lungs. If the disorder is diagnosed in early childhood, surgery can be successfully performed to prevent any lasting detrimental effects. Research suggests that this condition is more prevalent among females than among males (Table 3.2.2.6).

Table 3.2.2.6. Atrial septal defect.

Nature of Any Difference	Citations
More in males	
No signif. difference	
More in females	**NORTH AMERICA** *United States*: Roesler 1934 (diagnosed); Fontana & Edwards 1962 (diagnosed)

3.2.2.7. Bicuspid Aortic Valve

Persons who are born with only two cusps in the aortic valve instead of the usual three are diagnosed as having a bicuspid aortic valve. This is a relatively common congenital heart condition that is usually not diagnosed until adulthood. The one available study concluded that this condition was more prevalent among males than among females (Table 3.2.2.7).

Table 3.2.2.7. Bicuspid aortic valve.

Nature of Any Difference	Citations
More in males	**NORTH AMERICA** *United States*: Roberts 1970 (diagnosed)
No signif. difference	
More in females	

3.2.2.8. Bilateral Renal Agenesis (Potter's Syndrome)

Potter's syndrome, or bilateral renal agenesis, is a rare congenital condition in which the kidneys fail to form and the adrenal glands take on an abnormal shape. The condition occurs in approximately one of every 4,000 births and one study found it to be more common in males than in females (Table 3.2.2.8).

Table 3.2.2.8. Bilateral renal agenesis (Potter's syndrome).

Nature of Any Difference	Citations
More in males	**NORTH AMERICA** *United States*: Potter 1972:305 (diagnosed)
No signif. difference	
More in females	

3.2.2.9. Cleft Palate

Cleft palate is a birth defect in which there is an opening (cleft) in the roof of the mouth, which makes speech difficult. According to the one located study on sex differences in this congenital disorder, more females than males are affected (Table 3.2.2.9).

Table 3.2.2.9. Cleft palate.

Nature of Any Difference	Citations
More in males	
No signif. difference	
More in females	**NORTH AMERICA** *United States*: Hay 1971 (diagnosed)

3.2.2.10. Cleft Uvula

Persons diagnosed with cleft uvula have an unusual fleshy mass hanging from the soft palate in the back of the throat that is split vertically and is commonly associated with being diagnosed with cleft palate. Without repairing a cleft uvula, speech is difficult. Table 3.2.2.10 indicates that the single study of the cleft uvula found no significant gender difference in the occurrence of this condition.

Table 3.2.2.10. Cleft uvula.

Nature of Any Difference	Citations
More in males	
No signif. difference	**NORTH AMERICA** *United States*: Meskin et al. 1964 (diagnosed)
More in females	

3.2.2.11. Coarctation of the Aorta

Coarctation of the aorta refers to a constriction of the middle aortic valve. This condition appears to be more prevalent in males than females (Table 3.2.2.11).

Table 3.2.2.11. Coarctation of the aorta.

Nature of Any Difference	Citations
More in males	**EUROPE** *Italy*: Morino et al. 1976 (diagnosed) **NORTH AMERICA** *United States*: Fontana & Edwards 1962 (diagnosed)
No signif. difference	
More in females	

3.2.2.12. Congenital Mitral Insufficiency

Congenital mitral insufficiency involves the inability of the heart's mitral valve to close properly, resulting in blood leakage (back flow) to the left atrium. One study of deaths due to this condition concluded that it was more common in males than in females (Table 3.2.2.12).

Table 3.2.2.12. Congenital mitral insufficiency.

Nature of Any Difference	Citations
More in males	**NORTH AMERICA** *United States*: Mage & Donner 2004:1213 (infant, death)
No signif. difference	
More in females	

3.2.2.13. Cor Biloculare

The normal heart has four chambers. In the cor biloculare condition, there are only two, with a failure of the atrium and ventricular septums (walls of the heart) to form, causing them to share one atrioventricular valve. According to Table 3.2.2.13, this disorder is equally prevalent among males and females.

Table 3.2.2.13. Cor biloculare.

Nature of Any Difference	Citations
More in males	**NORTH AMERICA** *United States*: Mage & Donner 2004:1213 (infant, death)
No signif. difference	**NORTH AMERICA** *United States*: Fontana & Edwards 1962 (diagnosed)
More in females	

3.2.2.14. Cor Triloculare Biatrium

As noted above, the heart normally has four chambers. In the case of cor triloculare biatruim, there is only a single ventricle (with no septum). Table 3.2.2.14 indicates that this congenital condition is more prevalent in males than in females.

Table 3.2.2.14. Cor triloculare biatrium.

Nature of Any Difference	Citations
More in males	**NORTH AMERICA** *United States*: Fontana & Edwards (diagnosed) 1962
No signif. difference	
More in females	

3.2.2.15 Craniosynostosis

Craniosynostosis is a congenital abnormality involving the joining of the plates comprising the skull. As shown in Table 3.2.2.15, sex differences in these abnormalities may depend on which part of the skull is being scrutinized.

Table 3.2.2.15. Craniosynostosis.

Nature of Any Difference	Citations
More in males	**NORTH AMERICA** *United States*: Shillito & Matson 1968* (sagittal only, diagnosed)
No signif. difference	
More in females	**NORTH AMERICA** *United States*: Shillito & Matson 1968* (coronal only, diagnosed)

3.2.2.16. Diaphragmatic Hernia

A diaphragmatic hernia is a small tear or opening in the diaphragm allowing the stomach to protrude upwards into the thoracic cavity. One study reported that this condition was more prevalent in males than in females (Table 3.2.2.16).

Table 3.2.2.16. Diaphragmatic hernia.

Nature of Any Difference	Citations
More in males	**NORTH AMERICA** *United States*: D Johnson et al. 1967 (diagnosed)
No signif. difference	
More in females	

3.2.2.17. Down's Syndrome

Down's syndrome is a birth defect usually caused by a condition known as *Trisomy 21.* More rarely, it can be caused by the translocation of portions of a chromosome. Scientists believe that there is a direct correlation between the age of a child's mother at the time of birth and this chromosomal abnormality. At a rate of about 1 in 100 births, mothers over the age of 40 have the greatest probability of giving birth to a child with Down's syndrome. A child with Down's syndrome can suffer from mild to severe retardation. Other associated disorders are thyroid problems, diabetes, and various difficulties with the eyes, ears, and neck.

Sex differences in the prevalence of Down's syndrome have been investigated in multiple countries. As shown in Table 3.2.2.17, all studies agree that this condition is more common in males than in females.

Table 3.2.2.17. Down's syndrome.

Nature of Any Difference	Citations
More in males	**ASIA** *China*: Huang et al. 1967 (diagnosed); *Japan*: Tonomura et al. 1966 (diagnosed); Slavin et al. 1967 (diagnosed) **EUROPE** *France*: Bernheim et al. 1979 (diagnosed); J Nielsen et al. 1981 (diagnosed); *Sweden*: Lindsten et al. 1981 (diagnosed) **NORTH AMERICA** *Canada*: Uchida 1970 (diagnosed); *United States*: Chitham & MacIver 1965 (diagnosed); Huether 1990 (diagnosed); MB Petersen et al. 1993 (diagnosed); DK Griffin et al. 1996 (diagnosed)
No signif. difference	
More in females	

3.2.2.18. Chromosomal Abnormalities Other Than Down's Syndrome

One study was located concerning a chromosomal condition that is much rarer than Down's syndrome – Edward's syndrome. It was found to be more common among females than among males (Table 3.2.2.18).

Table 3.2.2.18. Chromosomal abnormalities other than Down's syndrome.

Nature of Any Difference	Citations
More in males	
No signif. difference	
More in females	**NORTH AMERICA** *United States*: AI Taylor 1968 (Trisomy 18 or Edward's Syndrome, diagnosed)

3.2.2.19. Endocardial Cushion Defects

Endocardial cushion defects, also known as atrioventricular (AV) canal or septal defects, include a range of defects characterized by involvement of the atrial septum, the ventricular septum, and one or both of the AV valves. The one available study found death due to this condition to be more common among girls than boys (Table 3.2.2.19).

Table 3.2.2.19. Endocardial cushion defects.

Nature of Any Difference	Citations
More in males	
No signif. difference	
More in females	**NORTH AMERICA** *United States*: Mage & Donner 2004:1213 (infant, death)

3.2.2.20. Esophageal Atresia (With or Without Fistula)

Esophageal atresia is a condition in which the upper part of the esophagus is closed off from the lower portion, often resulting in a pouch forming at the end, preventing food or fluid that is being ingested from reaching the stomach. One study found more males than females with this condition (Table 3.2.2.20).

Table 3.2.2.20. Esophageal atresia (with or without fistula).

Nature of Any Difference	Citations
More in males	**NORTH AMERICA** *United States*: Hay 1971 (diagnosed)
No signif. difference	
More in females	

3.2.2.21. Exstrophy of the Bladder

Exstrophy (the turning of an organ inside out) of the bladder is a congenital defect that occurs when the abdominal wall along with other structures of the abdomen and the ventral wall of the bladder do not fuse in utero. Therefore, the urinary tract becomes exposed and the bladder then protrudes into the abdominal wall. The available studies show that this condition is more prevalent in males than in females (Table 3.2.2.21).

Table 3.2.2.21. Exstrophy of the bladder.

Nature of Any Difference	Citations
More in males	**NORTH AMERICA** *United States*: Harvard & Thompson 1951 (diagnosed); Gross 1953:1000 (diagnosed); Uson et al. 1959 (diagnosed); Higgins 1962 (diagnosed)
No signif. difference	
More in females	

3.2.2.22. Hemangioma

Hemangiomas (birthmarks) are new-formed benign tumors. Most forms of hemangiomas are dark red and raised relative to the surrounding skin. According to the studies of gender differences in this condition, the prevalence of hemangiomas is greater in females than in males (Table 3.2.2.22).

Table 3.2.2.22. Hemangioma.

Nature of Any Difference	Citations
More in males	
No signif. difference	
More in females	**NORTH AMERICA** *United States*: AG Pratt 1953; Myrianthopoulos & Chung 1974 (diagnosed); Moroz 1983; Chiller et al. 2002:1572

3.2.2.23. Hypoplastic Left Heart

Hypoplastic left heart is a life-threatening congenital disease that can sometimes be surgically corrected. According to one study, more females are diagnosed as having this condition, although another study concluded that more males actually die from it (Table 3.2.2.23).

Table 3.2.2.23. Hypoplastic left heart.

Nature of Any Difference	Citations
More in males	**NORTH AMERICA** *United States*: Mage & Donner 2004:1213 (death during infancy)
No signif. difference	
More in females	**NORTH AMERICA** *United States*: Child & Dennis 1977 (diagnosed)

3.2.2.24. Idiopathic Scoliosis

Idiopathic (unknown cause) scoliosis is a curvature of the thoracolumbar spine that is usually detected in adolescence. The one study of sex differences in this disorder concluded that females are more often affected than males (Table 3.2.2.24).

Table 3.2.2.24. Idiopathic scoliosis.

Nature of Any Difference	Citations
More in males	
No signif. difference	
More in females	**NORTH AMERICA** *United States*: Riseborough & Wynne-Davies 1973 (diagnosed)

3.2.2.25. Inguinal Hernia

Inguinal (groin) hernias are caused by a weakness in the abdomen wall. The available research on the prevalence of this congenital condition suggest that it is either more common among males or that there are no significant gender differences (Table 3.2.2.25).

Table 3.2.2.25. Inguinal hernia.

Nature of Any Difference	Citations
More in males	**NORTH AMERICA** *United States*: Myrianthopoulos & Chung 1974 (diagnosed)
No signif. difference	**NORTH AMERICA** *United States*: Cleary et al. 2004:43*
More in females	

3.2.2.26. Klippel-Feil Anomaly

Klippel-Feil is characterized by a short, wide neck, low posterior hairlines and having limited movement in the neck. This anomaly is caused by the reduction in the number of vertebrae in the cervical spine during the third month of gestation. One study failed to detect a significant sex difference in the prevalence of this anomaly (Table 3.2.2.26).

Table 3.2.2.26. Klippel-Feil anomaly.

Nature of Any Difference	Citations
More in males	
No signif. difference	**NORTH AMERICA** *United States*: Gray et al. 1964 (diagnosed)
More in females	

3.2.2.27. Meckel’s Diverticulum

Meckel’s diverticulum is a common anomaly that is characterized by the out pouching of the small intestine at the connection with the large intestine during fetal development. This pouch is not made of the same tissue as the intestines, but rather from the tissue that makes up the stomach. In this area acid can be produced, therefore causing ulceration. In one study, males were diagnosed more with this condition than were females (Table 3.2.2.27).

Table 3.2.2.27. Meckel’s diverticulum.

Nature of Any Difference	Citations
More in males	**NORTH AMERICA** *United States*: Gross 1953:211 (diagnosed)
No signif. difference	
More in females	

3.2.2.28. Meningomyelocele (Spina Bifida)

Meningomyelocele is characterized by the absence of the bony encasement of the spinal cord causing a protrusion of the meninges and other spinal substance outside of the vertebral column. The two studies cited in Table 3.2.2.28 came to inconsistent conclusions regarding any gender difference in the prevalence of meningomyelocele.

Table 3.2.2.28. Meningomyelocele (spina bifida).

Nature of Any Difference	Citations
More in males	**NORTH AMERICA** *United States*: AS Brown & Susser 1997 (diagnosis)
No signif. difference	
More in females	**EUROPE** *Britain*: Carter & Evans 1973 (diagnosed)

3.2.2.29. Metatarsus Adductus

The one available study of metatarsus adductus, an abnormality in which the fore part of the foot tends to draw towards the middle of the foot, concluded that the condition is more pronounced in males than in females (Table 3.2.2.29).

Table 3.2.2.29. Metatarsus adductus.

Nature of Any Difference	Citations
More in males	**NORTH AMERICA** *United States*: Myrianthopoulos & Chung 1974 (diagnosed)
No signif. difference	
More in females	

3.2.2.30. Occipital Encephalocele

Occipital encephalocele is a neural tube defect in which brain tissue herniates through an opening in the back of the cranium. As shown in Table 3.2.2.30, this condition appears to be more prevalent in females than in males.

Table 3.2.2.30. Occipital encephalocele.

Nature of Any Difference	Citations
More in males	
No signif. difference	
More in females	**NORTH AMERICA** *United States*: Lorber 1967 (diagnosed); Mealey et al. 1970 (diagnosed)

3.2.2.31. Encephalocele Other Than Occipital

Encephalocele other than occipital is a neural tube defect in the cranium other than at the back of the head, such as at the top or near the front. Table 3.2.2.31 indicates that this condition occurs in roughly equal frequency in both sexes.

Table 3.2.2.31. Encephalocele other than occipital.

Nature of Any Difference	Citations
More in males	
No signif. difference	**NORTH AMERICA** *United States*: Lorber 1967 (diagnosed); Mealey et al. 1970 (diagnosed)
More in females	

3.2.2.32. Omphalocele

Omphalocele is the protrusion of the intestine through a large opening in the abdominal wall with only a thin transparent membrane covering it. One study concluded that males are more often diagnosed with this defect than females (Table 3.2.2.32).

Table 3.2.2.32. Omphalocele.

Nature of Any Difference	Citations
More in males	**NORTH AMERICA** *United States*: Hay 1971 (diagnosed)
No signif. difference	
More in females	

3.2.2.33. Patent Ductus Arteriosus

Patent (or open) ductus arteriosus is a condition in which blood is not prevented from entering the lungs following birth. As shown in Table 3.2.2.33, one study concluded that this condition is more common in females than in males.

Table 3.2.2.33. Patent ductus arteriosus.

Nature of Any Difference	Citations
More in males	
No signif. difference	
More in females	**NORTH AMERICA** *United States*: Fontana & Edwards 1962 (diagnosed)

3.2.2.34. Pectus Excavatum

Pectus excavatum (also called hollowed breast, funnel breast, and funnel chest) is undue depression of the sternum. As shown in Table 3.2.2.34, the only study of a sex difference in this disorder concluded that males are diagnosed with this disease more often than females.

Table 3.2.2.34. Pectus excavatum.

Nature of Any Difference	Citations
More in males	**NORTH AMERICA** *United States*: Myrianthopoulos & Chung 1974 (diagnosed)
No signif. difference	
More in females	

3.2.2.35. Persistent Common Atrioventricular Canal Defect

Persistent common atrioventricular canal defect is an abnormality of the heart that appears to occur in roughly equal frequencies in males and females (Table 3.2.2.35).

Table 3.2.2.35. Persistent common atrioventricular canal defect.

Nature of Any Difference	Citations
More in males	
No signif. difference	**NORTH AMERICA** *United States*: Fontana & Edwards 1962 (diagnosed)
More in females	

3.2.2.36. Pulmonary Stenosis

Pulmonary stenosis is the narrowing of the opening between the pulmonary artery and the right ventricle. This causes the heart to pump harder to get the blood past the narrow valve. The one study that was located on any sex difference in the incidence of this condition concluded that there was none (Table 3.2.2.36).

Table 3.2.2.36. Pulmonary stenosis.

Nature of Any Difference	Citations
More in males	
No signif. difference	**NORTH AMERICA** *United States*: Fontana & Edwards 1962 (diagnosed)
More in females	

3.2.2.37. Polydactyly

Polydactyly refers to having more than the usual number of digits in the hands or the feet. No significant sex difference was found in one study of this condition (Table 3.2.2.37).

Table 3.2.2.37. Polydactyly.

Nature of Any Difference	Citations
More in males	
No signif. difference	**NORTH AMERICA** *United States*: Stevenson et al. 1966 (diagnosed)
More in females	

3.2.2.38. Pyloric Stenosis

Pyloric stenosis refers to an unusual narrowing of the passage from the stomach to the duodenum (small intestine). Both studies cited in Table 3.2.2.38 indicate that this condition occurs more in males than in females.

Table 3.2.2.38. Pyloric stenosis.

Nature of Any Difference	Citations
More in males	**NORTH AMERICA** *United States*: A Damon 1964; Myrianthopoulos & Chung 1974 (diagnosed)
No signif. difference	
More in females	

3.2.2.39. Sirenomelia

Sirenomelia (literally meaning mermaid) is the birth defect of having both legs fused together. The one available study found the condition to be more prevalent in males than in females (Table 3.2.2.39).

Table 3.2.2.39. Sirenomelia.

Nature of Any Difference	Citations
More in males	**NORTH AMERICA** *United States*: Kampmeier 1927 (diagnosed)
No signif. difference	
More in females	

3.2.2.40. Stomach Duplication

Some individuals are born with more than one stomach. Studies of this condition have indicated that it is more common among females than among males (Table 3.2.2.40).

Table 3.2.2.40. Stomach duplication.

Nature of Any Difference	Citations
More in males	
No signif. difference	
More in females	**NORTH AMERICA** *United States*: Kammerer 1969 (diagnosed); Kremer et al. 1970 (diagnosed)

3.2.2.41. Syndactyly

Syndactyly is an anomaly characterized by "webbing" between the digits on either the hands or the feet. More males than females seem to exhibit this condition (Table 3.2.2.41).

Table 3.2.2.41. Syndactyly.

Nature of Any Difference	Citations
More in males	**NORTH AMERICA** *United States*: Hay 1971 (of the hand, diagnosed)
No signif. difference	
More in females	

3.2.2.42. Talipes Calcaneovalgus

Talipes calcaneovalgus is a deformity of the foot in which the heel is turned outward from the midline of the body and the anterior part of the foot is elevated. Table 3.2.2.42 suggests that this condition is more common among females than in males.

Table 3.2.2.42. Tapiles calcaneovalgus.

Nature of Any Difference	Citations
More in males	
No signif. difference	
More in females	**NORTH AMERICA** *United States*: Hay 1971 (diagnosed)

3.2.2.43. Talipes Equinovarus

Talipes equinovarus (commonly known as clubfoot) is a deformity of the foot in which the heel is turned inward. According to one study, males exhibit this congenital condition more than females (Table 3.2.2.43).

Table 3.2.2.43. Talipes equinovarus.

Nature of Any Difference	Citations
More in males	**NORTH AMERICA** *United States*: Palmer et al. 1974 (diagnosed)
No signif. difference	
More in females	

3.2.2.44. Tetralogy of Fallot

Tetralogy of fallot is a combination of four congenital cardiac defects. The two studies shown in Table 3.2.2.44 both indicated that males are more likely than females to have this set of defects.

Table 3.2.2.44. Tetralogy of fallot.

Nature of Any Difference	Citations
More in males	**EUROPE** *Britain*: Brinton & Campbell 1953 (diagnosed) **NORTH AMERICA** *United States*: Fontana & Edwards 1962 (diagnosed)
No signif. difference	
More in females	

3.2.2.45. Total Anomalous Pulmonary Venous Connection

Total anomalous pulmonary venous connection involves obstructions of the pulmonary veins. The one available study suggests that males and females suffer from this congenital condition to essentially the same degree (Table 3.2.2.45).

Table 3.2.2.45. Total anomalous pulmonary venous connection.

Nature of Any Difference	Citations
More in males	
No signif. difference	**NORTH AMERICA** *United States*: Fontana & Edwards 1962 (diagnosed)
More in females	

3.2.2.46. Transposition of Great Vessels

The congenital condition known as trasposition of great vessels involves the switching of the two vessels carrying blood away from the heart. The one study cited in Table 3.2.2.46 concluded that this condition was more common among males than among females.

Table 3.2.2.46. Transposition of great vessels.

Nature of Any Difference	Citations
More in males	**NORTH AMERICA** *United States*: Fontana & Edwards 1962 (diagnosed)
No signif. difference	
More in females	

3.2.2.47. Congenital Malformation of Truncus Arteriosus

The truncus arteriosus is an arterial artery connected with the fetal heart and in some infants the connection is malformed. One study concluded that this deformity is more common in males than in females (Table 3.2.2.47).

Table 3.2.2.47. Congenital malformation of truncus arteriosus.

Nature of Any Difference	Citations
More in males	**NORTH AMERICA** *United States*: Fontana & Edwards 1962 (diagnosed)
No signif. difference	
More in females	

3.2.2.48. Umbilical Hernia

An umbilical hernia is the protrusion of part of the intestine through the abdominal wall at the point of the umbilicus. The one available study indicated this condition is more common in females than males (Table 3.2.2.48).

Table 3.2.2.48. Umbilical hernia.

Nature of Any Difference	Citations
More in males	
No signif. difference	
More in females	**NORTH AMERICA** *United States*: Hay 1971 (diagnosed)

3.2.2.49. Urethral Obstruction Malformation Complex "Prune Belly" Syndrome

Prune belly syndrome (PBS) is an uncommon congenital anomaly involving genito-urinary abnormalities and a partial or complete absence of abdominal wall musculature. According to the one located study, males exhibit these conditions to a greater degree than do females (Table 3.2.2.49).

Table 3.2.2.49. Urethral obstruction malformation complex "prune belly" syndrome.

Nature of Any Difference	Citations
More in males	**NORTH AMERICA** *United States*: Welch & Kearney 1974 (diagnosed)
No signif. difference	
More in females	

3.2.2.50. Ventricular Septal Defect

Defective ventricular septums involve a failure of the right and left ventricles of the heart to separate, often creating a hole in a portion of the affected area. While two studies found no significant sex difference in the prevalence of this condition, one study concluded that infant girls were more likely to die from it than were infant boys (Table 3.2.2.50).

Table 3.2.2.50. Ventricular septal defect.

Nature of Any Difference	Citations
More in males	
No signif. difference	**NORTH AMERICA** *United States*: Selzer 1949 (diagnosed); Fontana & Edwards 1962 (diagnosed)
More in females	**NORTH AMERICA** *United States*: Mage & Donner 2004:1213 (infant, death)

3.2.3. Drug-Induced Illnesses

Not only can drugs prevent and cure diseases, they can also cause or exacerbate them. The tables that follow pertain to physical (not mental or behavioral) illnesses that appear to be at least partially induced by exposure to drugs. So far, alcohol has been the focus of the available research on this topic.

3.2.3.1. Alcohol-Related Diseases in General

Exposure to high levels of alcohol can induce various ailments (besides cirrhosis of the liver, as discussed below). The available research on alcohol-induced diseases in general have all concluded that males are more likely than females to suffer from these diseases (Table 3.2.2.1). This conclusion concurs with the conclusion reached by Wasilow-Mueller and Erickson (2001) based on a conventional literature review.

Table 3.2.2.1. Alcohol-related diseases in general.

Nature of Any Difference						Postpubertal
						Adult
More prevalent in males						**EUROPE** *Britain*: L Harrison & Gardiner 1999:1876 (diagnosed); *Finland*: Koskinen et al. 1995:1392 (diagnosed); *Sweden*: S Lindberg & Agren 1988 (diagnosed)
No signif difference						
More prevalent in females						

3.2.3.2. Cirrhosis of the Liver

Cirrhosis of the liver is a disease that is most common among persons who have consumed substantial amounts of alcohol over many years. Despite overwhelming evidence that males are much more likely than females to be heavy consumers of alcohol (discussed in Chapter 11) and are more likely to be alcoholics (covered in Chapter 6), Table 3.2.3.2 provides a somewhat mixed picture regarding gender differences in cirrhosis of the liver.

The reason for most of the inconsistencies can be detected by noting the qualifiers following citations appearing in the "more prevalent in females" row. Basically, males are more likely to be diagnosed with and to die from cirrhosis of the liver, but when attention is given strictly to persons who are considered alcoholics, females are more likely to be diagnosed with this disease. It may be that the livers of females are more susceptible to cirrhosis than the livers of males given similar degrees of heavy alcohol exposure.

Table 3.2.3.2. Cirrhosis of the liver.

Nature of Any Difference	Postpubertal		Multiple Age Categories
		Adult	
More prevalent in males		**EUROPE** *France*: Pequignot et al. 1974 (diagnosed) **NORTH AMERICA** *United States*: Spain 1945 (death); National Center for Health Statistics 1994 (death) **OCEANIA** *Australia*: P Wilkinson et al. 1969 (diagnosed); P Wilkinson et al. 1971 (diagnosed)	**NORTH AMERICA** *United States*: Terris 1967 (diagnosed); Waldron 1982:73 (death); VanNatta & Aitken 1985 (diagnosed); LA Wolfgang 1997:278 (diagnosed)
No signif. difference			
More prevalent in females		**EUROPE** *Britain*: M Morgan & Sherlock 1977 (among alcoholics, diagnosed); M Morgan et al. 1977 (younger age of death); Krasner et al. 1977 (among alcoholics); Saunders et al. 1981 (alcoholics, diagnosed); R Norton et al. 1987 (among alcoholics); *France*: Pequignot 1960 (among alcoholics, diagnosed); Pequignot et al. 1974 (among alcoholics, diagnosed); *Sweden*: Loft et al. 1987 (among alcoholics, more rapid & complete) **NORTH AMERICA** *United States*: S Sherlock & Scheuer 1973; MJ Ashley et al. 1977 (among alcoholics, diagnosed) **OCEANIA** *Australia*: Wilkinson et al. 1969 (among alcoholics, diagnosed)	**NORTH AMERICA** *United States*: U Becker et al. 1996 (among alcoholics, diagnosed); CG Harper et al. 1990 (among alcoholics, diagnosed)

3.2.4. Cancers

Cells of the body normally produce daughter cells at rates that are roughly equivalent to the rate of cell death. However, sometimes cells in a particular region of the body begin to proliferate at extremely high rates, eventually causing neighboring cells to do likewise. The resulting diseases are collectively known as cancer. Many studies have been conducted to determine if various types of cancer are more likely to afflict males or females.

3.2.4.1. Cancer in General

Nearly all studies of gender differences in overall prevalence of cancer, both in terms of diagnosis and death, have concluded that males are more often affected than is true for females (Table 3.2.4.1).

Table 3.2.4.1. Cancer in general.

Nature of Any Difference	Sub-Adolescent				Postpubertal		Multiple Age Categories
				Childhood	Adolescent	Adult	
Males more				**NORTH AMERICA** *United States*: National Center for Health Statistics 1994* (death)	**NORTH AMERICA** *United States*: National Center for Health Statistics 1994* (death)	**NORTH AMERICA** *United States*: Strickland 1988:384 (death); National Center for Health Statistics 1994* (death); Legato 1998 (shorter survival); DN Paltoo & Chu 2004 (American Indian & Alaska Natives, diagnosed) **RODENT** *Mouse*: L Gross 1941 (tumors)	**ASIA** China: L Yang et al. 2004:2162 (esophagus & cancer in general higher mortality); *Japan*: F Levi et al. 2003a:2616* (death) **EUROPE** *Britain*: D Field et al. 1997:2 (death); *Czech Republic*: Mackenbach et al. 1999:1804* (diagnosed); *Italy*: Crocetti & Paci 2002 (diagnosed); *Multiple European Countries*: F Levi et al. 2003a:2616* (death) **INTERNATIONAL** *Multiple countries*: Ferlay et al. 2001 (adult, age adjusted) **NORTH AMERICA** *Canada*: M Gangbe et al. 2004 (35 to 69 yrs); *United States*: Metropolitan Life Insurance Company 1942:7 (excluding cancer of the reproductive system and breast); A Johnson 1977a:24 (diagnosed); Waldron 1982:73 (death); Verbrugge 1985:158 (death); US Centers for Disease Control 1993 (death); American Cancer Society 1997 (diagnosed); Kramarow et al. 1999 (death); Mackenbach et al. 1999* (death); F Levi et al. 2003a:2616* (death) **MIDDLE EAST** *Saudi Arabia*: Tandon et al. 1995 (diagnosed)
No signif. difference							
Females more							**LATIN AMERICA** *Ecuador*: Sebastian & Hurtig 2004 (death) **NORTH AMERICA** *Canada*: Walters et al. 2002:687 (diagnosis)

3.2.4.2. Bladder Cancer

The limited research on bladder cancer has concluded that it is more common among males than females (Table 3.2.4.2).

Table 3.2.4.2. Bladder cancer.

Nature of Any Difference							Multiple Age Categories
More in males							**ASIA** *China*: L Yang et al. 2004:2162 (higher mortality) **EUROPE** *Sweden*: Hemminki & Li 2002:185 (diagnosed) **MIDDLE EAST** *Saudi Arabia*: Tandon et al. 1995 (diagnosed)
No signif. difference							
More in females							

3.2.4.3. Bone Cancer

Death from bone cancer has been found to be more common among males than among females. One study of mere diagnosis of the disease found no significant gender difference (Table 3.2.4.3).

Table 3.2.4.3. Bone cancer.

Nature of Any Difference							Multiple Age Categories
More in males							**ASIA** *Japan*: F Levi et al. 2003a:2615* (death) **EUROPE** *Several European Countries*: F Levi et al. 2003a:2615* (death) **NORTH AMERICA** *United States*: F Levi et al. 2003a:2615* (death)
No signif. difference							**MIDDLE EAST** *Saudi Arabia*: Tandon et al. 1995 (diagnosed)
More in females							

3.2.4.4. Brain/Nervous System, Cancer of the

Cancerous growths in the brain appear to be equally likely to affect males and females (Table 3.2.4.4).

Table 3.2.4.4. Brain/nervous system, cancer of the.

Nature of Any Difference							Multiple Age Categories
More in males							
No signif. difference							**EUROPE** Sweden: Hemminki & Li 2002:185 (diagnosed) **MIDDLE EAST** *Saudi Arabia*: Tandon et al. 1995 (diagnosed)
More in females							

3.2.4.5. Breast Cancer

Men do occasionally suffer from breast cancer. However, the vast majority of sufferers are women (Table 3.2.4.5).

Table 3.2.4.5. Breast cancer.

Nature of Any Difference			Multiple Age Categories
More among males			
No signif. difference			
More among females			**ASIA** *China*: L Yang 2004:2162 (higher mortality) **EUROPE** *Austria*: Stierer et al. 1995 (diagnosed); *Czech Republic*: Mackenbach et al. 1999:1804 (diagnosed); *Iceland*: Jonasson et al. 1996 (diagnosed); *Netherlands*: Siesling et al. 2003 (death); *Norway*: Mackenbach et al. 1999:1803 (diagnosed) **MIDDLE EAST** *Saudi Arabia*: Tandon et al. 1995 (diagnosed) **NORTH AMERICA** *Canada*: Conlon et al. 2002 (death); *United States*: F Adair 1943 (diagnosed); Waldron 1982:73 (death); Hecht & Winchester 1994 (diagnosed): JL Wagner et al. 1995 (diagnosed); Meyerowitz & Hart 1995; Donegan & Redlick 1996 (diagnosed); Borgen et al. 1997 (diagnosed); Donegan et al. 1998 (diagnosed); Mackenbach et al. 1999 (death); Scott-Conner et al. 1999 (diagnosed)

3.2.4.6. Cervical Cancer

One study reported the incidence of cervical cancer to be higher in females than in males, not at all surprising given that only females have a cervix (Table 3.2.4.6).

Table 3.2.4.6. Cervical cancer.

Nature of Any Difference			Multiple Age Categories
Males more			
No signif. difference			
Females more			**ASIA** *China*: L Yang 2004:2162

3.2.4.7. Cavernous Hemangioma

A tumorous growth with vascular channels that is found in a variety of interior organs is known as cavernous hemangioma. This condition is more common in older individuals and extremely rare in young children. The cavernous hemangioma is the most common type of benign liver tumor in adults. Sometimes this type of tumor causes abdominal pain or nausea and occasionally the mass is palpable. Larger, more troublesome masses can be treated surgically but if the hemangioma is asymptomatic, treatment is not necessary. In rare instances where the tumor forms on the brain, it can create lethal complications for the affected individual. Table 3.2.4.7 shows that the one available study concluded that cavernous hemangiomas are more common among females than among males.

Table 3.2.4.7. Cavernous hemangioma.

Nature of Any Difference							Multiple Age Categories
More in males							
No signif. difference							
More in females							**NORTH AMERICA** *United States*: Myrianthopoulos & Chung 1974 (diagnosed)

3.2.4.8. Colorectal Cancer

Colon and rectal cancers usually begin with polyps appearing sometime after the age of 40. Persons at highest risk for colorectal cancer are those with family histories of the disease. Considerable research is available on gender differences in this relatively common disease, but the evidence is somewhat inconsistent. Overall, Table 3.2.4.8 suggests that males are more likely to be diagnosed with colorectal cancer, and that females are more likely to survive the disease.

Table 3.2.4.8. Colorectal cancer.

Nature of Any Difference							Multiple Age Categories
More prevalent among males							**EUROPE** *Britain*: Dunlop et al. 1997; Tavani et al. 1999 (diagnosed); Wichmann et al. 2001 (shorter survival); *Germany*: Verschueren et al. 1997 (shorter survival); *Italy*: Crocetti & Paci 2002 (diagnosed): *Netherlands*: Siesling et al. 2003* (rectal cancer, death); *Scotland*: McArdle et al. 2003* (shorter survival); *Several European Countries*: Fernandez et al. 2002 (death) **MIDDLE EAST** *Saudi Arabia*: Tandon et al. 1995 (diagnosed) **NORTH AMERICA** *Canada*: Froggatt et al. 1999:100 (diagnosis); *United States*: Petrek et al. 1985 (shorter survival); Walters et al. 1996 (shorter survival)
No signif. difference							**EUROPE** *Britain*: MP Coleman et al. 1999 (diagnosed & length of survival); *Sweden*: Hemminki & Li 2002:185 (diagnosed)**;** *Scotland*: Scottish Cancer Intelligence Unit 2000 (diagnosed); McArdle et al. 2003* (diagnosed) *Spain*: Gonzalez et al. 2005 (length of survival) **MIDDLE EAST** *Turkey*: Degertekin et al. 2000 (diagnosed) **NORTH AMERICA** *United States*: Ries et al. 1991 (length of survival); Vasen et al. 1996 (diagnosed)
More prevalent among females							**EUROPE** *Netherlands*: Siesling et al. 2003* (colon, death)

3.2.4.9. Endocrine Gland, Cancer of the

Endocrine glands are those that produce a variety of essential hormones, such as those surrounding emotions and sexuality. Although it is based on just one study, Table 3.2.4.9 indicates that cancer that attacks various endocrine glands is more common among females than among males.

Table 3.2.4.9. Endocrine gland, cancer of the.

Nature of Any Difference							Multiple Age Categories
More in males							
No signif. difference							
More in females							**EUROPE** *Sweden*: Hemminki & Li 2002:185

3.2.4.10. Eye, Cancer of the

Eye cancer is a rare form of the disease. According to the one available study, it afflicts males to a greater degree than females (Table 3.2.4.10).

Table 3.2.4.10. Eye, cancer of the.

Nature of Any Difference							Multiple Age Categories
More in males							**MIDDLE EAST** *Saudi Arabia*: Tandon et al. 1995 (diagnosed)
No signif. difference							
More in females							

3.2.4.11. Kidney, Cancer of

Limited research on kidney cancer has reached somewhat inconsistent conclusions, with one study indicating that it is more prevalent among males and another suggesting males and females are equally susceptible (Table 3.2.4.11).

Table 3.2.4.11. Kidney, cancer of.

Nature of Any Difference							Multiple Age Categories
More in males							**EUROPE** *Sweden*: Hemminki & Li 2002:185
No signif. difference							**MIDDLE EAST** *Saudi Arabia*: Tandon et al. 1995 (diagnosed)
More in females							

3.2.4.12. Leukemia/Non-Hodgkin's Lymphoma

White blood cells are the body's infection fighters. Leukemia is a cancer that depletes the white blood cells in the blood system. Non-Hodgkin's lymphoma is a condition in which the lymphocytes are massively produced in the lymph nodes, thereby preventing the body from fighting infections properly. Numerous studies have found males to be afflicted with these forms of cancer more often than females (Table 3.2.4.12).

Table 3.2.4.12. Leukemia/non-Hodgkin's lymphoma.

Nature of Any Difference							Multiple Age Categories
More in males							**ASIA** *China*: L Yang et al. 2004:2162 (higher mortality); *Japan*: F Levi et al. 2003a:2615* (death, non-Hodgkin's lymphoma); F Levi et al. 2003a:2616* (death, leukemia) **EUROPE** *Sweden*: Hemminki & Li 2002:185* (leukemia); Hemminki & Li 2002:185* (non-Hodgkin's lymphoma); *Several European Countries*: F Levi et al. 2003a:2615* (death, non-Hodgkin's lymphoma); F Levi et al. 2003a:2616* (death, leukemia) **MIDDLE EAST** *Saudi Arabia*: Tandon et al. 1995 (diagnosed, leukemia) **NORTH AMERICA** *United States*: F Levi et al. 2003a:2615* (death, non-Hodgkin's lymphoma); F Levi et al. 2003a:2616* (death, leukemia)
No signif. difference							
More in females							

3.2.4.13. Lymphatic System Cancer/Hodgkin's Disease

Studies of cancer of the lymphatic system (Hodgkin's disease) has generally revealed no significant sex difference with regard to death rates (Table 3.2.4.13). The one qualification to this conclusion came from a study that traced deaths from the disease over time in Europe. It concluded that in the earliest decades for which data were analyzed, males had higher death rates than females, but in later decades no sex differences were detectable.

Table 3.2.4.13. Lymphatic system cancer/Hodgkin's disease.

Nature of Any Difference							Multiple Age Categories
More in males							**EUROPE** *Several European Countries*: F Levi et al. 2003a:2616* (death, during the 1960s and 1970s)
No signif. difference							**EUROPE** *Netherlands*: Siesling et al. 2003 (death); *Several European Countries*: F Levi et al. 2003a:2616* (death, during the 1980s & 1990s)
More in females							

3.2.4.14. Chronic Lymphocytic Leukemia

All of the available studies of chronic lymphocytic leukemia have determined that males are more likely than females to contract this form of cancer (Table 3.2.4.14).

Table 3.2.4.14. Chronic lymphocytic leukemia.

Nature of Any Difference					Postpubertal		
						Adult	
More in males						**EUROPE** *Britain*: A Pines et al. 1987; Catovsky et al. 1989 **NORTH AMERICA** *United States*: Minot & Isaacs 1924; Reinhard et al. 1959; Boggs et al. 1966; Paolino et al. 1984; JS Lee et al. 1987; Mandelli et al. 1987; Call et al. 1994; Diehl et al. 1999:2686	
No signif. difference							
More in females							

3.2.4.15. Liver Cancer

Cancer of the liver is a fairly common form of the disease that has been shown to afflict males to a greater extent than females (Table 3.2.4.15).

Table 3.2.4.15. Liver cancer.

Nature of Any Difference	Multiple Age Categories
More in males	**ASIA** *China*: Evans et al. 2002; L Yang et al. 2004:2162 (higher mortality); *Japan*: Sun et al. 2001:63 (death) **EUROPE** *Netherlands*: Siesling et al. 2003 (death) **MIDDLE EAST** *Saudi Arabia*: Tandon et al. 1995 (diagnosed)
No signif. difference	
More in females	

3.2.4.16. Lung Cancer

While people's genetic susceptibility to lung cancer is likely to vary, the primary cause appears to be exposure to cigarette smoke. Other environmental contributors to the disease are exposure to radon gas and exposure to substances such as asbestos, uranium, and arsenic.

Evidence surrounding sex differences in lung cancer is shown in Table 3.2.4.16. It is largely consistent with the generalization that males contract the disease at higher rates than do females, and they are less likely to survive for any given length of time following diagnosis. Strictly among smokers, however, females appear to contract lung cancer at higher rates.

Table 3.2.4.16. Lung cancer.

Nature of Any Difference	Postpubertal	Multiple Age Categories
	Adult	
More in males	**ASIA** *China*: L Yang et al. 2004:2162 (higher mortality); *Japan*: Minami et al. 2000 (shorter survival) **EUROPE** *France*: de Perrot et al. 2000 (shorter survival); *Italy*: Alexiou et al. 2002 (shorter survival) **LATIN AMERICA** *Columbia*: Visbal et al. 2004 (diagnosed & shorter survival) **NORTH AMERICA** *Canada*: Risch et al. 1993 (death); *United States*: F Burbank 1972 (death); US Department of Health & Human Services 1983 (death); JL Andrews et al. 1985 (diagnosed); CM Beard et al. 1988 (diagnosed); MK Ferguson et al. 1990* (shorter survival); WD Travis et al. 1996 (diagnosed); P Thomas et al. 2002 (shorter survival); Tammemagi et al. 2004:607 (shorter survival)	**ASIA** *Japan*: Ozasa et al. 2001 (death) **EUROPE** *Czech Republic*: Mackenbach et al. 1999:1804* (diagnosed); *Italy*: Crocetti & Paci 2002 (diagnosed); *Norway*: Mackenbach et al. 1999:1803* (death); *Spain*: Borras et al. 2001; *Sweden*: Nordlund et al. 1999 (diagnosed); Hemminki & Li 2002:185 **NORTH AMERICA** *United States*: Waldron 1986:41 (diagnosed); MK Ferguson et al. 1990* (death); Zang & Wynder 1996* (death); Kramarow et al. 1999 (death); Krieger et al. 1999:532 (diagnosed); Mackenbach et al. 1999* (death); McCann 2000 (diagnosed) **INTERNATIONAL** *Multiple Countries*: Trovato & Lalu 1998:15 (diagnosis, 7/7 countries)
No signif. difference	**NORTH AMERICA** *United States*: Agudo et al. 2000 (diagnosed, among smokers); Perneger 2001 (diagnosed, among smokers); Bain et al. 2004 (diagnosed, among smokers, control for amount smoked)	
More in females	**EUROPE** *Norway*: Engeland et al. 1996 (diagnosed, among smokers) **NORTH AMERICA** *Canada*: Risch et al. 1993 (death); *United States*: Brownson et al. 1992 (diagnosed, among smokers); RE Harris et al. 1993 (diagnosed, among smokers); Risch et al. 1993 (diagnosed, among smokers); Kure et al. 1996 (diagnosed, among smokers); Zang & Wynder 1996* (diagnosed & death, among smokers); Prescott et al. 1998 (death among smokers); HA Risch & Miller 2002 (diagnosed, among smokers)	

3.2.4.17. Mouth (Oral) Cancer

Table 3.2.4.17 indicates that the evidence surrounding any gender difference in the prevalence of oral cancer is quite inconsistent.

Table 3.2.4.17. Mouth (oral) cancer.

Nature of Any Difference	Postpubertal
	Adult
More in males	**EUROPE** *Hungary*: Ujpal et al. 2003 (in patients with diabetes mellitus) **NORTH AMERICA** *United States*: C Welch & Nathanson 1937 (shorter survival)
No signif. difference	**MIDDLE EAST** *Saudi Arabia*: Tandon et al. 1995 (diagnosed)
More in females	**NORTH AMERICA** *United States*: GW Taylor 1934 (diagnosed)

3.2.4.18. Ovarian/Testicular Cancer

Among mammals, the more basic sex is female, with males essentially being a variant on the female sex. Thus, the testes are essentially modified ovaries. Consequently, it is reasonable to consider ovarian and testicular cancer jointly. Research indicates that when ovarian and testicular cancer are combined into a single category (gonadal cancer), males have higher rates than do females (Table 3.2.4.18).

Table 3.2.4.18. Ovarian/testicular cancer.

Nature of Any Difference							Multiple Age Categories
More in males							**ASIA** *Japan*: F Levi et al. 2003a:2615* (death, gonadal) **EUROPE** *European Countries*: F Levi et al. 2003a:2615* (death, gonadal) **NORTH AMERICA** *United States*: F Levi et al. 2003a:2615* (death, gonadal)
No signif. difference							
More in females							

3.2.4.19. Pancreatic Cancer

The pancreas is a gland located in the abdominal cavity that produces insulin and other hormones. It also secretes enzymes necessary for digestion. Most, but not all, studies of gender differences in pancreatic cancer have all indicated that males contract the disease at higher rates than females (Table 3.2.4.19).

Table 3.2.4.19. Pancreatic cancer.

Nature of Any Difference						Postpubertal	
						Adult	
More in males						**ASIA** *Japan*: Sun et al. 2001:63 (diagnosed) **EUROPE** *Italy*: Crocetti & Paci 2002 (diagnosed); *Sweden*: Hemminki & Li 2002:185	
No signif. difference							
More in females						**NORTH AMERICA** *United States*: Michaud et al. 2001:924 (diagnosed)	

3.2.4.20. Plasmacytoma

Plasma cells are an integral part of the immune system and produce antibodies used to fight bacteria, fungi, and other harmful parasites. According to one study, males have cancerous growth of these cells more often than do females (Table 3.2.4.20).

Table 3.2.4.20. Plasmacytoma.

Nature of Any Difference							Multiple Age Categories
More in males							**MIDDLE EAST** *Saudi Arabia*: Tandon et al. 1995 (diagnosed)
No signif. difference							
More in females							

3.2.4.21. Prostate Cancer

The prostate gland produces a milky liquid found in male ejaculate and contains the enzyme 5 alpha reductase which converts testosterone into other male hormones. Cancer of the prostate is usually slow growing but common form of cancer. Because only males have a prostate gland, prostate cancer is exclusively found in males. As shown in Table 3.2.4.21, this fact has only been documented to a minimal degree.

Table 3.2.4.21. Prostate cancer.

Nature of Any Difference							Multiple Age Categories
More in males							**MIDDLE EAST** *Saudi Arabia*: Tandon et al. 1995 (diagnosed)
No signif. difference							
More in females							

3.2.4.22. Skin Cancer

Studies have indicated that males contract and die from skin cancer in general to a greater extent than females (Table 3.2.4.22). However, females appear to contract melanomas specifically more than males.

Table 3.2.4.22. Skin cancer.

Nature of Any Difference							Multiple Age Categories
More in males							**EUROPE** *Italy*: Crocetti & Paci 2002 (diagnosed) **NORTH AMERICA** *United States*: Center for Disease Control 1995 (death) **MIDDLE EAST** *Saudi Arabia*: Tandon et al. 1995 (diagnosed)
No signif. difference							
More in females							**EUROPE** *Hungary*: J Olah 2005 (malignant melanoma specifically); *Sweden*: Hemminki & Li 2002:185 (melanoma specifically)

3.2.4.23. Soft Tissues, Cancer of

The body's so-called soft tissue includes muscle tissue, fat deposits, fibrous tissue, blood vessels, and the like, all of which sometimes become cancerous. Whether a sex difference exists in this regard remains to be established (Table 3.2.4.23).

Table 3.2.4.23. Soft tissues, cancer of.

Nature of Any Difference							Multiple Age Categories
More in males							**EUROPE** *Several European Countries*: F Levi et al. 2003a:2615* (death) **NORTH AMERICA** *United States*: F Levi et al. 2003a:2615* (death)
No signif. difference							**ASIA** *Japan*: F Levi et al. 2003a:2615* (death) **MIDDLE EAST** *Saudi Arabia*: Tandon et al. 1995 (diagnosed)
More in females							

3.2.4.24. Stomach Cancer

In most countries, cancer of the stomach is relatively rare. Only in Japan is it one of the leading forms of cancer (Yatsuya et al. 2002). As shown in Table 3.2.4.24, in nearly all countries yet investigated, the rate of stomach cancer is significantly higher among males than among females. Only in Japan did one study conclude that the death rate due to stomach cancer was higher in females (even though more males were diagnosed with this disease).

Table 3.2.4.24. Stomach cancer.

Nature of Any Difference					Postpubertal		Multiple Age Categories
						Adult	
More in males							**AFRICA** *Senegal*: Niang et al. 1996 (death) **ASIA** *China*: L Yang 2004:2162 (higher mortality); *Japan*: Japanese Ministry of Health & Welfare 1998 (death); Sun et al. 2001:63 (diagnosed); Yatsuya et al. 2002 (death) **EUROPE** *Netherlands*: Siesling et al. 2003 (death); *Spain*: Herrero et al. 1996 (diagnosed); *Sweden*: Hemminki & Li 2002:185; *Switzerland*: Spataro et al. 1994 (death); *Several European Countries*: Aragones et al. 1997 (diagnosed); Mikov et al. 1997 (death) **MIDDLE EAST** *Saudi Arabia*: Tandon et al. 1995 (diagnosed) **NORTH AMERICA** *United States*: Neugut et al. 1996 (death) **OCEANIA** *Tasmania*: Ansari 1995 (death)
No signif. difference							
More in females						**ASIA** *Japan*: Sun et al. 2002 (death)	

3.2.4.25. Thyroid Cancer

Two studies have found thyroid cancer to be more prevalent among females than among males (Table 3.2.4.25).

Table 3.2.4.25. Thyroid cancer.

Nature of Any Difference							Multiple Age Categories
More in males							
No signif. difference							
More in females							**EUROPE** *Sweden*: Hemminki & Li 2002:185 (diagnosed) **MIDDLE EAST** *Saudi Arabia*: Tandon et al. 1995 (diagnosed)

3.2.4.26. Upper Aerodigestive Track, Cancer of

The evidence is inconsistent with respect to any sex difference in cancer of the throat and esophagus (Table 3.2.4.26).

Table 3.2.4.26. Upper aerodigestive track, cancer of.

Nature of Any Difference							Multiple Age Categories
More in males							**ASIA** *China*: L Yang et al. 2004:2162 (higher mortality) **EUROPE** *Sweden*: Hemminki & Li 2002:185 **MIDDLE EAST** *Saudi Arabia*: Tandon et al. 1995* (diagnosed, nasopharynx)
No signif. difference							
More in females							**MIDDLE EAST** *Saudi Arabia*: Tandon et al. 1995* (diagnosed, esophagus)

3.2.5. Cardiovascular Diseases

Any ailment of the heart or the arteries and vesicles that carry the blood to and from the heart is considered a cardiovascular disease. In all contemporary industrial societies, it is responsible for more deaths than any other cause.

3.2.5.1. Heart Disease in General (Coronary Heart Disease)

Coronary heart disease (CHD) is the number one killer of both males and females in the United States and most other industrialized societies. Many studies have sought to determine if a sex difference exists in the prevalence of CHD, with fairly consistent results (Table 3.2.5.1). By and large, males have been shown to be more likely to be diagnosed and to die from CHD, except among diabetics, where females have higher probabilities of CHD deaths (also see the meta-analysis by Kanaya et al. 2002). Oddly enough, however, males are more likely to recover from early forms of CHD than are females, perhaps mainly due to their more faithfully maintaining a rigorous exercise regimen (Brezinka & Kittel 1996).

Table 3.2.5.1. Heart disease in general (coronary heart disease).

Nature of Any Difference					Postpubertal		Multiple Age Categories
						Adult	
Males more						**ASIA** *Japan*: Uemura & Pisa 1988 (death); Iwasaka et al. 1994 (risk of early death) **EUROPE** *Belgium*: Pardaens et al. 1985 (death); *Britain*: WJ Martin 1956 (death); MF Oliver & Boyd 1959 (death); Pohjola et al. 1980 (death); K Robinson et al. 1992 (death); P Wilkinson et al. 1994 (death); Tunstall-Pedoe et al. 1996 (death); Lloyd-Jones et al. 1999 (diagnosed); Hanratty et al. 2000:913 (diagnosed); *Finland*: Jousilahti et al. 1999; *France*: T Simon et al. 2001 (congestive heart failure, death); *Germany*: Helmert et al. 1992:1287 (death); *Hungary*: CS Nemeth et al 2004* (less than 80 years of age); L Mark et al. 2004 (atrial fibrillation); *Netherlands*: Breteler et al. 1994 (elderly, diagnosed); *Scotland*: Tunstall-Pedoe et al. 1996 (diagnosed); *Sweden*: Henning & Lundman 1975 (afflicted, diagnosed); Hammar et al. 1992 (death); Molarius & Janson 2002:366 (elderly, diagnosed); Sundquist et al. 2004 (diagnosed) **NORTH AMERICA** *Canada*: Wister & Gee 1994 (death); O'Farrell et al. 2000 (recovery through exercise); Walters et al. 2002:687; *United States*: Willius et al. 1933 (death); H Levy & Boas 1936 (death); AM Master et al. 1939 (death); Heberden 1941 (death); Moriyama & Woalsey 1951 (death); DM Spain & Bradess 1957 (death); Moriyama et al. 1958 (death); Pell & D'Alonzo 1958 (death); Ritterband et al. 1963 (death); A Damon 1964*; Furman 1968 (death); Kannel & Feinleib 1972 (diagnosed); SH Preston 1976 (diagnosed); A Johnson 1977b (death); SG Haynes et al. 1978:386 (middle age & elderly, diagnosed); SG Haynes et al. 1980:40 (middle age & elderly, diagnosed); Morgenstern 1980:192 (diagnosed); RL Phillips et al. 1980:306 (earlier age of death); Waldron 1982:73 (death); Wingard 1982 (diagnosed); Gee & Veevers 1983 (diagnosed); CA Martin et al. 1983 (death); Wingard et al. 1983 (Whites, diagnosed & death); Kannel & Abbott 1984 (diagnosed); Puletti et al. 1984 (afflicted, diagnosed); Verbrugge 1985:158 (death); Hazzard 1986 (death); DJ Lerner & Kannel 1986 (death, diagnosed); Waldron 1986:41 (diagnosed); Syme & Guralnik 1987 (death); McKinlay 1996:11* (diagnosed); KA Park & Clifford 1987 (diagnosed); Dittrich et al. 1988 (diagnosed & death); Strickland 1988:385 (death); Wingard et al. 1989 (diagnosed); ND Wong et al. 1989 (death); Barrett-Connor & Bush 1991a* (middle age, diagnosed); Greenland et al. 1991 (diagnosed); Cannistra et al. 1992 (recovery through exercise); Krumholz et al. 1992 (afflicted); RP Donahue et al;. 1993e (among diabetics); RJ Goldberg et al. 1993 (afflicted & death); EL Williams et al. 1993 (death); RC Becker et al. 1994 (mortality earlier); JS Jenkins et al. 1994 (death); Hoy et al. 1995* (Navajo, diagnosis); Orchard 1996 (death); RJ Thomas et al. 1996 (recovery through exercise); Mosca et al. 1997 (generalization); PS Douglas 1997 (diagnosed); Lavie & Milani 1997 (recovery through exercise); Price & Fowkes 1997; Miettinen et al. 1998 (among diabetics); V Benson & Marano 1998 (diagnosed); LP Fried et al. 1998 (death); Nikiforov & Mamaen 1998 (death); Kramarow et al. 1999 (death); CS Hayward et al. 2000 (diagnosed); American Heart Association 2001 (diagnosed); RN Anderson 2002 (death); Paeratakul et al. 2002:1206 (death); US Department of Health & Human Services 2001 (death); Ray 2002 (recovery through exercise); Vaccarino et al. 2002 (diagnosed); Koertge et al. 2003 (recovery through exercise); N Goldman et al. 2004 (elderly, at risk); Murtagh & Hubert 2004:1409 (elderly, diagnosed) **OCEANIA** *Australia*: T Peter et al. 1978 (diagnosed); AD Lopez 1983 (diagnosed) **INTERNATIONAL** *Multiple Countries*: Puffer & Griffith 1967 (diagnosed); Tejada et al. 1968 (death); Tunstall-Pedoe et al. 1994 (5 to 1 ratio); Bobak & Marmot 1996; R Jackson et al. 1997; Nikiforov & Mamaru 1998* (several 20th Century countries); Trovato & Lalu 1998:12 (7/7 countries, death); Weidner 1998 (several Western countries); Tunstall et al. 1999 (diagnosed)	**NORTH AMERICA** *United States*: Grundy 1999 (early symptoms); CLM Keyes 2004:271 (early symptoms)
No signif. difference						**NORTH AMERICA** *United States*: A Damon 1964* (elderly); Barrett-Connor & Bush 1991a* (elderly, diagnosed); McKinlay 1996:11*; Oh et al. 2002* (elderly, diagnosed) **OCEANIA** *Australia*: Wang & Hoy 2004 (diabetes sufferers, diagnosed) **INTERNATIONAL** *Multiple Countries*: Nikiforov & Mamaru 1998* (several 19th Century countries)	
Females more						**EUROPE** *Hungary*: CS Nemeth et al. 2004* (over 80 years of age); E. Nieszer 2005 (diabetic patients with heart-coronary disorders) *Norway*: Mackenbach et al. 1999:1803 (death); *Sweden*: Rosengren et al. 2001 (death) **LATIN AMERICA** *Brazil*: Barreto et al. 2004:113 (elderly) **NORTH AMERICA** *United States*: Kannel & McGee 1979a & b (among diabetes sufferers, diagnosed); EC Moore 1980 (death); Kannel 1985a & b (diabetes sufferers, diagnosis); Barrett-Connor et al. 1991b (among diabetics, death); RP Donahue et al. 1993 (among diabetics, diagnosed); GT O'Connor 1993 (death); Seeman et al. 1993 (among diabetics, diagnosed); Goldschmid et al. 1994 (diabetics, diagnosed); Hoy et al. 1995* (Navajo with diabetes, diagnosis); Folsom et al. 1997 (diabetes sufferers, diagnosis); PW Wilson 1998 (diabetes patients, diagnosed); Mackenbach et al. 1999 (death); Vaccarino et al. 1999a & b (death); Simoni-Wastila 2000:291 (self-diagnosed); Vaccarino et al. 2001 (death); Oh et al. 2002* (elderly, diagnosed); Folsom et al. 2003 (diabetes sufferers, diagnosed)	**NORTH AMERICA** *United States*: American Heart Association 2001 (death)

3.2.5.2. Relationship between Heart Disease and Fat Consumption

According to two studies, there is a stronger positive link between heart disease and consumption of fatty foods in women than in men (Table 3.2.5.2).

Table 3.2.5.2. Relationship between heart disease and fat consumption.

Nature of Any Difference					Postpubertal		
						Adult	
More among males							
No signif. difference							
More among females						**EUROPE** *Denmark*: Jakobsen et al. 2004; *England*: Boniface & Tefft 2002	

3.2.5.3 Hypertension

Persistent hypertension or high blood pressure can cause damage to the arteries, heart, and kidneys. Individuals who are obese, have a sedentary lifestyle, or family history of high blood pressure are more prone to experience problems with hypertension. Table 3.2.5.3 suggests that there are no consistent sex differences with respect to hypertension.

Table 3.2.5.3. Hypertension.

Nature of Any Difference					Postpubertal		Multiple Age Categories
						Adult	
More males						**ASIA** *Japan*: Ministry of Welfare of Japan 1995 **NORTH AMERICA** *United States*: TL Bush et al. 1983 (diagnosed); DM Gilligan et al. 1994 (diagnosed); Gerhard & Ganz 1995 (diagnosed) **OCEANIA** *Papua New Guinea*: Schall 1992* (before age 45)	**NORTH AMERICA** *Canada*: Choiniere et al. 2000:S15 (diagnosed); *United States*: Nelesen & Dimsdale 1994 (diagnosed)
No signif. difference						**NORTH AMERICA** *United States*: Cornoni-Huntley et al. 1989; Paeratakul et al. 2002:1206 (diagnosed)	**NORTH AMERICA** *United States*: US Department of Health & Human Services 1983 (Blacks, diagnosed); Cleary et al. 2004:43* (hypertension)
More females						**LATIN AMERICA** *Brazil*: Barreto et al. 2004:113 (elderly) **NORTH AMERICA** *United States*: Anastos et al. 1991 (age not controlled); FH Edwards et al. 1998 (prior to coronary bypass surgery); Hogue et al. 2001 (prior to coronary bypass surgery); Vakili et al. 2001 (elderly, patients undergoing surgery, diagnosed); Hogue et al. 2003 (elderly, prior to coronary bypass surgery) **OCEANIA** *Papua New Guinea*: Schall 1992* (beyond age 45)	**NORTH AMERICA** *United States*: Schwab et al. 1974 (diagnosed); EC Moore 1980 (diagnosed); Dunlap et al. 1999 (diagnosed)

3.2.5.4. Age of Onset of Coronary Heart Disease

One study concluded that males with coronary heart disease exhibited symptoms of the disease at an earlier average age when compared to females (Table 3.2.5.4).

Table 3.2.5.4. Age of onset of coronary heart disease.

Nature of Any Difference					Postpubertal		
						Adult	
Males earlier						**EUROPE** *Britain*: Sharp 1994 (diagnosed about 10 years earlier)	
No signif. difference							
Females earlier							

3.2.5.5 Cardiovascular Risk Symptoms in General (Other Than Angina)

The few studies of which sex exhibits the most risk symptoms for cardiovascular disease (other than angina) have all concluded that males exceed females (Table 3.2.5.5).

Table 3.2.5.5. Cardiovascular risk symptoms in general (other than angina).

Nature of Any Difference					Postpubertal		Multiple Age Categories
						Adult	
Greater in males						**EUROPE** *Sweden*: Nilsson et al. 1996 (diagnosed) **NORTH AMERICA** *United States*: MA Allison & Wright 2005 (coronary calcification)	**NORTH AMERICA** *United States*: Weinblatt et al. 1973 (diagnosed); Kannel et al. 1979 (diagnosed)
No signif. difference							
Greater in females							

3.2.5.6 Angina Pectoris (Chest Pain)

Several studies have sought to determine which sex experiences greater angina pectoris, i.e., severe paroxysmal pain in the chest associated with an insufficient supply of blood to the heart. It is chest pain associated with heart disease. These studies have come to somewhat different conclusions, depending on the nature of the subjects studied. When studying all subjects, such as in a general survey of a population, more males report having had angina. However, studies of individuals who have been diagnosed with mild or severe heart disease have concluded that females have higher angina rates (Table 3.2.5.6.)

Table 3.2.5.6. Angina pectoris (chest pain).

Nature of Any Difference					Postpubertal	
						Adult
Males more						**EUROPE** *Scotland*: H Richards et al. 2000 (self-reported); *Sweden*: Rosengren et al. 2003:305 (self-reported)
No signif. difference						
Females more						**NORTH AMERICA** *United States*: Kannel & Feinleib 1972 (diagnosed); Lerner & Kanel 1986; Rankin 1990 (heart surgery patients, self-reported); KB King et al. 1992 (heart disease patients; self-reported); KB King et al. 1994 (heart disease patients, self-reported); Artinian & Duggan 1995 (heart disease patients, self-reported); Ayanian et al. 1995 (heart surgery patients, self-reported); Riegel & Gocka 1995 (heart attack victims); Herlitz et al. 2000 (heart disease patients, self-reported); Vaccarino et al. 2002 (heart disease patients, self-reported); Vaccarino et al. 2003:311 (heart disease patients, self-reported)

3.2.5.7. Atrioventricular Nodal Reentrant Tachycardia

Atrioventricular nodal reentrant tachycardia is a type of heart ailment that two studies have found to be more common among females than among males (Table 3.2.5.7).

Table 3.2.5.7. Atrioventricular nodal reentrant tachycardia.

Nature of Any Difference					Postpubertal	
						Adult
Males more						
No signif. difference						
Females more						**NORTH AMERICA** *United States*: R Harris & Weissfeld 1991 (self-report); Brugada & Brugada 1997 (diagnosed)

3.2.5.8. Cardiac Arrhythmia

Cardiac arrhythmia is a group of conditions in which the muscle contraction of the heart is irregular or is faster or slower than normal. The studies below specifically deal with the irregularity of the ventricular cavity of the heart after a person consumes drugs. The ventricular is a small cavity or chamber within a body or an organ, especially the right or left ventricle of the heart or any of the interconnecting ventricles of the brain (Table 3.2.5.8)

Table 3.2.5.8. Cardiac arrhythmia.

Nature of Any Difference					Postpubertal	
						Adult
Males more						
No signif. difference						
Females more						**NORTH AMERICA** *United States*: Reinoehl et al. 1996 (among long QT syndrome patients, after consuming various drugs, ventrical); Ebert et al. 1998 (among long QT syndrome patients, after consuming various drugs, ventrical); Drici & Clement 2001 (among long QT syndrome patients, after consuming various drugs, ventrical)

3.2.5.9. Claudication

Claudication refers to pain in the legs due to constriction of the blood arteries. Research is inconsistent with respect to any gender difference in this ailment (Table 3.2.5.9).

Table 3.2.5.9. Claudication.

Nature of Any Difference					Postpubertal	
						Adult
Males more						**NORTH AMERICA** *United States*: Kannel & McGee 1985
No signif. difference						
Females more						**NORTH AMERICA** *United States*: AW Gardner 2002 (pain from claudication, elderly)

3.2.5.10. Dyslipidemia

Dyslipidemia refers to a variety of disorders involving lipoprotein metabolism, including both over and under production. Among the manifestations of dyslipidemia is elevated cholesterol production, especially low-density lipoprotein (LDL) "bad" cholesterol. Over half of all patients with hypertension also suffer from dyslipidemia (O'Meara et al. 2004:1313). When combined, these two conditions seriously elevate an individual's risk of coronary heart disease. Research indicates that males with hypertension are especially likely to also exhibit symptoms of dyslipidemia (Table 3.2.5.10).

Table 3.2.5.10. Dyslipidemia.

Nature of Any Difference					Postpubertal	
						Adult
Males more						**LATIN AMERICA** *Brazil*: Mazzarolo-Cruz et al. 1995 **NORTH AMERICA** *United States*: O'Meara et al. 2004
No signif. difference						
Females more						

3.2.5.11. Hypokalemia (Low Potassium)

The one available study of sex differences in hypokalemia (or low potassium levels) concluded that this condition was more common among females than among males (Table 3.2.5.11).

Table 3.2.5.11. Hypokalemia (low potassium).

Nature of Any Difference					Postpubertal	
					Adolescent	Adult
Males more						
No signif. difference						
Females more					**NORTH AMERICA** *United States*: Wysowski et al. 2003* (diagnosed)	**NORTH AMERICA** *United States*: Wysowski et al. 2003* (diagnosed)

3.2.5.12. Idiopathic Cardiomyopathic Disease

Idiopathic cardiomyopathic disease may be more common among females than males, especially among the elderly (Table 3.2.5.12.).

Table 3.2.5.12. Idiopathic cardiomyopathic disease.

Nature of Any Difference					Postpubertal	
						Adult
Males more						
No signif. difference						**NORTH AMERICA** *United States*: Karlson et al. 1994; Nohria et al. 1998
Females more						**NORTH AMERICA** *United States*: Tofler et al. 1987 (elderly); Woodfield et al. 1997 (elderly); Vaccarino et al. 1999; Vaccarino et al. 2001 (elderly)

3.2.5.13. Idiopathic Ventricular Fibrillation (Brugada Syndrome)

The Brugada syndrome is a rare heart disease ailment that appears to be most common among persons of South Eastern Asian ancestry. Its cause is still poorly understood but appears to involve inherited deficiencies in the passage of sodium ions through crucial cell structures in the heart. Research indicates that the condition is more common among males than among females (Table 3.2.5.13)

Table 3.2.5.13. Idiopathic ventricular fibrillation (Brugada syndrome).

Nature of Any Difference	Postpubertal	Multiple Age Categories
	Adult	
Males more	**NORTH AMERICA** *United States*: Rodriguez et al. 1992	**NORTH AMERICA** *United States*: Brugada & Brugada 1997
No signif. difference		
Females more		

3.2.5.14. Ischemic Heart Disease

Ischemic heart disease is a condition caused by restricted blood flow to an area of the body. Plaque build up in the blood vessels as well as blood clots are common causes of obstruction. If a vessel has been blocked for a period of time and oxygen deprivation of the tissue is significant, heart tissues can die leading to myocardial infarction or heart attack. According to Table 3.2.5.14, females are more likely to die from ischemic heart disease than males.

Table 3.2.5.14. Ischemic heart disease.

Nature of Any Difference	Postpubertal	Multiple Age Categories
	Adult	
More in males		
No signif. difference		
More in females	**NORTH AMERICA** *United States*: SG Haynes et al. 1980 (diagnosed, clerical workers)	**EUROPE** *Czech Republic*: Mackenbach et al. 1999:1804* (death); *Norway*: Mackenbach et al. 1999:1803* (death) **NORTH AMERICA** *United States*: Mackenbach et al. 1999* (death)

3.2.5.15. Acute Myocardial Infarction (Heart Attack)

Studies of persons who have had acute myocardial infarctions have shown that women are more likely to die soon after suffering such an attack than are men. Research as to the causes of the higher women AMI death rates has primarily attributed it to the older age of females when they suffer these heart attacks (Marrugat et al. 2001).

Generally, males are more likely than females to suffer from heart attacks (as noted above regarding coronary heart disease in general) and some studies have also reported that they have higher probabilities of death. The main exception is among the elderly, where females, especially following menopause, who have a heart attack are more likely than males to die within the first month. However, after the first month of suffering a myocardial infarction, the sex difference in probability of death among the elderly becomes roughly the same. It is also the case that among diabetics, heart attacks affect females more (Table 3.2.5.15).

Table 3.2.5.15. Acute myocardial infarction (heart attack).

Nature of Any Difference	Postpubertal	Multiple Age Categories
	Adult	
More in males	**ASIA** *China*: He et al. 1994 (shorter survival) **EUROPE** *Britain*: RG Heller & Jacobs 1978 (diagnosed); *Denmark*: Abildstrom et al. 2002 (death); *Sweden*: Rosengren et al. 2003:305 (diagnosis & death) **NORTH AMERICA** *United States*: T Gordon et al. 1977 (diagnosed); Chandra et al. 1998 (men more among age controlled acute MI); Kannel et al. 1998 (death); Hochman et al. 1999 (patients with acute coronary symptoms) **INTERNATIONAL** *Several Western Countries*: Stolley 1980 (diagnosed)	
No signif. difference	**NORTH AMERICA** *United States*: RF Young & Kahana 1993* (age controlled); Brett & Madans 1995 (age controlled); Herlitz et al. 1996 (death); Vaccarino et al. 1999* (middle-age)	**EUROPE** *Britain*: D Field et al. 1997:2 (death)
More in females	**EUROPE** *Britain*: Sonka et al. 1996 (elderly, death); *Italy*: Bolego et al. 2002 (heavy smokers); *Spain*: Marrugat et al. 1994 (elderly, death); Marrugat et al. 1999* (elderly, death); Marrugat et al. 2001 (elderly, death); *Sweden*: Njolslad et al. 1996 (heavy smokers) **NORTH AMERICA** *United States*: Greenland et al. 1991 (elderly, death, age controlled); RF Young & Kahana 1993* (age not controlled); RC Becker et al. 1994 (elderly, death); JS Jenkins et al. 1994 (elderly, death); Demirovic et al. 1995 (elderly, death); Vaccarino et al. 1995 (elderly, death); Vaccarino et al. 1998 (elderly, death); Marrugat et al. 1999* (death); Vaccarino et al. 1999* (elderly, death)	**NORTH AMERICA** *United States*: MJ Garcia et al. 1974 (diabetics, diagnosed); AR Folsom et al. 1997 (diabetics, diagnosed); Lowel et al. 1999 (diabetics, diagnosed)

3.2.5.16. Age of First Heart Attack

All of the available studies have concluded that males are more likely than females to experience their first heart attack (myocardial infarction) at an earlier age (Table 3.2.5.16). Males are at higher risk of myocardial infarction than women, and males are also more likely to suffer myocardial infarction earlier in life. Fortunately, in modern industrial societies with efficient emergency medical networks, initial heart attacks are usually no longer lethal.

Table 3.2.5.16. Age of first heart attack.

Nature of Any Difference	Postpubertal	
		Adult
Males younger		**ASIA** *China*: He et al. 1994 **EUROPE** *Scotland*: Tunstall-Pedoe et al. 1996 **MIDDLE EAST** *Israel*: Greenland et al. 1991; Behar et al. 1994 **NORTH AMERICA** *United States*: Puletti et al. 1984; Dittrich et al. 1988; K Robinson et al. 1988; Fiebach et al. 1990; C Maynard et al. 1992; Chiriboga et al. 1993; Vacek et al. 1993; RC Becker et al. 1994; Flavell 1994; Kostis et al. 1994; Demirovic et al. 1995; SM Moore 1995; Kober et al. 1996; Kudenchuk et al. 1996; Hochman et al. 1997; Chandra et al. 1998; FH Edwards et al. 1998; Hochman et al. 1999
No signif. difference		
Females younger		

3.2.5.17. Obstruction of Arteries

A form of arteriosclerosis, atherosclerotic obstructions are obstructions characterized by atheromatous plaques containing cholesterol and lipids on the innermost layer of the walls of large and medium-sized arteries. One study found this type of obstruction to be more common among males than among females (Table 3.2.5.17).

Table 3.2.5.17. Obstruction of arteries.

Nature of Any Difference	Postpubertal	
		Adult
Males more		**NORTH AMERICA** *United States*: JW Kennedy et al. 1982 (atherosclerotic obstruction associated with chest pain)
No signif. difference		
Females more		

3.2.5.18. Survival After Myocardial Infarction

Research concerning which sex is more likely to survive a heart attack has yielded conflicting results. Among the reasons may be the age of the individuals being studied and the exact length of time used in defining survival (Table 3.2.5.18).

Table 3.2.5.18. Survival after myocardial infarction.

Nature of Any Difference					Postpubertal	
						Adult
Males more or longer						**ASIA** *China*: He et al. 1994 **EUROPE** *Britain*: Sonke et al. 1996; *Germany*: B Herman et al. 1997; *Scotland*: Tunstall-Pedoe et al. 1996; *Spain*: Marrugat et al. 1998 (after 28 days & after 6 months); *Sweden*: Hammar et al. 1992; Rosengren 2001* (under 50 years of age most associated with diabetes) **NORTH AMERICA** *United States*: Weinblatt et al. 1973; DJ Lerner & Kannel 1986 (age controlled); Dittrich et al. 1988; K Robinson et al. 1988; Fiebach et al. 1990; Krumholz et al. 1992; C Maynard et al. 1992; Chiriboga et al. 1993; HD White et al. 1993; RJ Goldberg et al. 1993; Karlson et al. 1994; Kostis et al. 1994; Marrugat et al. 1994; KL Lee et al. 1995 (females die more after 30 days); Marrugat et al. 1998; KF Adams et al. 1999 (heart failure); Vaccarino et al. 1999* (women higher mortality) **OCEANIA** *Australia*: T Peter et al. 1978 **INTERNATIONAL** *Several Western Countries*: Stolley 1980 (diagnosed)
No signif. difference						**EUROPE** *Britain*: Gan et al. 2000 (survival after 30 days among elderly) **NORTH AMERICA** *United States*: Vaccarino et al. 1999* (after age 70)
Females more or longer						**EUROPE** *Sweden*: Rosengren 2001* (males after 50 years old) **NORTH AMERICA** *United States*: Brett & Madans 1995*; Heer et al. 2002 **RODENT** *Mouse*: Cavasin et al. 2000 (failure to survive); Cavasin et al. 2004 (failure to survive)

3.2.5.19. Long QT Syndrome

Long QT syndrome is a rare inherited condition in which there is an unusually long time lapse between the Q and the T portion of the heart's electrical rhythm. It usually begins to present itself in childhood or adolescence, and can often cause death if left untreated. According to the available research, this condition is more common among females than among males or there is no significant gender difference (Table 3.2.5.19)

Table 3.2.5.19. Long QT syndrome.

Nature of Any Difference	Multiple Age Categories
Males more	
No signif. difference	**NORTH AMERICA** *United States*: Stramba-Badiale et al. 1995 (diagnosed); PJ Schwartz et al. 2000 (diagnosed)
Females more	**NORTH AMERICA** *United States*: Zareba et al. 1995

3.2.5.20. Q-Wave Infarctions

The one study located bearing on sex differences in heart attacks due to abnormal Q-waves concluded that it was more common among males than among females (Table 3.2.5.20).

Table 3.2.5.20. Q-wave infarctions.

Nature of Any Difference	Postpubertal
	Adult
Males more	**EUROPE** *Scotland*: Tunstall-Pedoe et al. 1996
No signif. difference	
Females more	

3.2.5.21. Peripheral Arterial Disease

The one study of gender differences in peripheral arterial disease concluded that it was more common among females than among males (Table 3.2.5.21).

Table 3.2.5.21. Peripheral arterial disease.

Nature of Any Difference	Postpubertal
	Adult
Males more	
No signif. difference	
Females more	**NORTH AMERICA** *United States*: Vogt et al. 1994 (elderly, asymptomatic)

3.2.5.22. Stenosis (Aortic Valve Stenosis)

Aortic valve stenosis affects the pumping capacity of the ventricle and results from the narrowing or obstruction of the aortic valve. It is predominantly an illness of persons over 70 years of age. The available research suggests that males are more likely than females to be diagnosed with this disease (Table 3.2.5.22).

Table 3.2.5.22. Stenosis (aortic valve stenosis).

Nature of Any Difference	Prepubertal	Postpubertal
	Infant	Adult
Males more	**NORTH AMERICA** *United States*: Mage & Donner 2004:1213 (death)	**NORTH AMERICA** *United States*: Braunwald et al. 1963 (elderly, diagnosed); Kral et al. 1993 (elderly obese persons, diagnosed); Marceau 1999 (elderly obese persons, diagnosed); Schroder et al. 1998 (elderly, shorter survival)
No signif. difference		
Females more		

3.2.5.23. Stroke (Cerebrovascular Disease)

Strokes occur when a blood vessel becomes blocked, thereby preventing blood from traveling to the brain. As shown in Table 3.2.5.23, only subtle gender differences in the incidence of strokes have been found.

Table 3.2.5.23. Stroke (cerebrovascular disease).

Nature of Any Difference					Postpubertal		Multiple Age Categories
						Adult	
More in males							**NORTH AMERICA** *United States*: Waldron 1982:73 (death); US Centers for Disease Control 1992* (diagnosed, before age 70); SL Murphy 2000 (death)
No signif. difference						**NORTH AMERICA** *United States*: Kertesz & Sheppard 1981 (recovery); Damasio et al. 1989; Kertesz & Benke 1989 (recovery); Cleary et al. 2004:43*	**EUROPE** *Britain*: D Field et al. 1997:2 (death)
More in females							**NORTH AMERICA** *United States*: US Centers for Disease Control 1992* (diagnosed, after age 70)

3.2.5.24. Relationship Between Stroke and Sodium Intake

One study failed to find any sex difference in the relationship between stroke risk (cerebrovascular disease) and salt intake (Table 3.2.5.24).

Table 3.2.5.24. Relationship between strokes and salt intake.

Nature of Any Difference					Postpubertal		
						Adult	
More in males							
No signif. difference						**ASIA** *Japan*: Nagata et al. 2004 (death from stroke, salt intake)	
More in females							

3.2.5.25. Recovering From a Stroke

A few studies have suggested that females recover more completely from strokes than do males (Table 3.2.5.25).

Table 3.2.5.25. Recovering from a stroke.

Nature of Any Difference					Postpubertal		
						Adult	
Better in males							
No signif. difference							
Better in females						**MIDDLE EAST** *Israel*: Groswasser et al. 1998 (measured by ability to walk) **NORTH AMERICA** *United States*: Savitz et al. 2005 **RODENT** *Gerbils*: ED Hall et al. 1991 (subsequent stroke after ischemia)	

3.2.5.26. Takayasu's Arthritis

One study found that a type of arthritis, known as Takayasu's arthritis, was more common in females than in males (Table 3.2.5.26).

Table 3.2.5.26. Takayasu's arthritis.

Nature of Any Difference							Multiple Age Categories
More in males							
No signif. difference							
More in females							**NORTH AMERICA** *United States*: Conn & Hunder 1989 (diagnosed)

3.2.5.27. Thrombocytopenic Purpura

Thrombocytopenic purpura is a blood disorder characterized by low platelets and low red blood cells, having abnormal renal function, and neurological abnormalities. This is caused by a deficiency in the ADAMTS13 enzyme, which causes the platelets to clump together and the red blood cells to break down. No significant differences in the likelihood of males or females to contract this disorder have been found (Table 3.2.5.27).

Table 3.2.5.27. Thrombocytopenic purpura.

Nature of Any Dif-ference	Prepubertal				Postpubertal		Multiple Age Categories
				Childhood	Adolescent		
Males more							
No signif. difference				**NORTH AMERICA** *United States*: RH Aster 1985	**NORTH AMERICA** *United States*: P Jacobs et al. 1986		**NORTH AMERICA** *United States*: Pizzuto & Ambriz 1984
Females more							

3.2.5.28. Thromboangitis Obliterans/Buerger's Disease

Buerger's disease is a rare type of peripheral arterial disease that involves the smaller arteries of the extremities. Blood clots may form causing the arteries to become blocked. As the vessels become blocked and the lack of oxygen to the tissues causes pain and necrosis, the extremities may have to be amputated (Table 3.2.5.28). One study shows that this disease is more prevalent in males than in females.

Table 3.2.5.28. Thromboangitis obliterans/buerger's disease.

Nature of Any Difference						Multiple Age Categories
Males more						**NORTH AMERICA** *United States*: Lie 1987
No signif. difference						
Females more						

3.2.5.29. Thrombosis

Deep Vain Thrombosis, or DVT, is a blood clot that can form in the legs and sometimes move to more vital organs such as the lungs, where it may be fatal. Limited research has concluded that thrombosis is more common in males than in females (Table 3.2.5.29).

Table 3.2.5.29. Thrombosis.

Nature of Any Difference						Adult	
Males more						**NORTH AMERICA** *United States*: Wessler 1980 **RODENT** *Rat*: Uzunova et al. 1976	
No signif. difference							
Females more							

3.2.5.30. Torsades de Pointes

Torsades de pointes is a disturbance of the heart rhythm in the heart's lower chamber often resulting in dizziness, fainting, and sometimes fatal cardiac arrest. The long Q-T syndrome is fairly often associated with torsades de pointes. Research on gender differences in torsades de pointes has shown it to be considerably more common among females than among males (Table 3.2.5.30).

Table 3.2.5.30. Torsades de pointes.

Nature of Any Difference							Multiple Age Categories
Males more							
No signif. difference							
Females more							**NORTH AMERICA** *United States*: Makkar et al. 1993 (diagnosis); Kawasaki et al. 1995 (diagnosis); Lehmann et al. 1996 (diagnosis)

3.2.6. Digestive Diseases/Ailments

A limited number of studies have investigated sex differences in a variety of digestive disorders. The results are summarized in the following section.

3.2.6.1. Digestive Diseases/Ailments in General

Two studies of general digestive ailments both concluded that females exhibit symptoms at higher rates than males (Table 3.2.6.1).

Table 3.2.6.1. Digestive diseases/ailments in general.

Nature of Any Difference	Postpubertal
	Adult
Males more	
No signif. difference	
Females more	**NORTH AMERICA** *United States*: Kroenke & Price 1993 (diagnosis, vomiting); Cleary et al. 2004:43 (diagnosis, stomach problems)

3.2.6.2. Abdominal Pain

Abdominal pain can be caused by various factors ranging from stomach ulcers to excess gas. Most studies have concluded that females are more likely to report experiencing such pain than is the case for males (Table 3.2.6.2).

Table 3.2.6.2. Abdominal pain.

Nature of Any Difference	Sub-adolescent	Postpubertal		Multiple Age Categories
	Childhood	Adolescent	Adult	
More in males				
No signif. difference	**EUROPE** *Britain*: Apley & Naish 1957 (diagnosed); Faull & Nicol 1986 (diagnosed)	**EUROPE** *Finland*: Aro et al. 1987 (diagnosed)		**EUROPE** *Sweden*: HI Andersson et al. 1993 (diagnosed)
More in females		**EUROPE** *Denmark*: Oster 1972 (diagnosed); *Sweden*: Larsson 1991 (diagnosed)	**NORTH AMERICA** *United States*: N Lester et al. 1994 (young, diagnosed)	**EUROPE** *New Zealand*: FR James et al. 1991 (diagnosed) **NORTH AMERICA** *United States*: H Taylor & Curran 1985 (diagnosed); Von Korff et al. 1988 (diagnosed); Ritchey et al. 1991 (homeless persons, diagnosed); Magni et al. 1992 (diagnosed)

3.2.6.3. Constipation

The available research indicates that females are more likely than males to suffer from constipation (Table 3.2.6.3).

Table 3.2.6.3. Constipation.

Nature of Any Difference	Multiple Age Categories
More in males	
No signif. difference	
More in females	**ASIA** *Malaysa*: YM Tan et al. 2003 (among irritable bowel syndrome sufferers); *Singapore*: Chen et al. 2000; *Taiwan*: Lu et al. 2005 (among irritable bowel syndrome sufferers) **EUROPE** *Britain*: Furnham & Kirkcaldy 1997 **NORTH AMERICA** *United States*: Schwab et al. 1974 (diagnosed); Kroenke & Price 1993; Chang & Heikemper 2002; Vaccarino et al. 2003:311 (among heart disease patients following surgery); Cleary et al. 2004:43

3.2.6.4. Diarrhea

Findings have been somewhat inconsistent with respect to any gender differences in the incidence of diarrhea, although the nature of the inconsistencies may depend on the age of individuals and whether or not they suffer from irritable bowel syndrome (Table 3.2.6.4).

Table 3.2.6.4. Diarrhea.

Nature of Any Difference	Prepubertal		Postpubertal	Multiple Age Catergories
	Toddler	Early Childhood	Adult	
More in males			**EUROPE** *Britain*: WG Thompson 1997 (among irritable bowel syndrome patients) **NORTH AMERICA** *United States*: OY Lee et al. 2001 (among irritable bowel syndrome sufferers)	**EUROPE** *Britain*: Talley et al. 1998
No signif difference				
More in females	**MIDDLE EAST** *Egypt*: Tekce 1990 (urban, severe)	**MIDDLE EAST** *Egypt*: Makinson 1986 (severe)		

3.2.6.5. Irritable Bowel Syndrome

The irritable bowel syndrome (IBS) is typified by abdominal discomfort often associated with oscillating bouts of constipation and diarrhea. With the exception of persons living in Asian countries (where evidence of sex differences have been quite mixed), females have been repeatedly found to exhibit symptoms of this ailment to greater degrees than males (Table 3.2.6.5) (also see review by Drossman et al. 1997 for a similar conclusion).

Table 3.2.6.5. Irritable bowel syndrome.

Nature of Any Difference	Postpubertal
	Adult
More common in males	**ASIA** *India*: Mathur et al. 1966 (symptoms); *Sri Lanka*: Mendis et al. 1982 (symptoms)
No signif. difference	**ASIA** *China*: Kwan et al. 2002; *Japan*: Gwee et al. 2004*; *Singapore*: Gwee et al. 2004*; *Taiwan*: Lu et al. 2003
More common in females	**AISIA** *Bangladesh*: Masud et al. 2001 (symptoms); *Hong Kong*: Kwan et al. 2002 (symptoms) **EUROPE** *Britain*: Heaton et al. 1992 (persons with IBS symptoms); R Jones & Lydeard 1992; *Italy*: Costantini et al. 1993 (symptoms); *Netherlands*: Osterberg et al. 1993*; *Sweden*: Jorgensen et al. 1993 (diagnosis) **NORTH AMERICA** *United States*: Drossman et al. 1993; Longstreth & Wolde-Tsadik 1993a; Longstreth & Wolde-Tsadik 1993b; Toner & Akman 2000 (symptoms); Camilleri 2001; OY Lee et al. 2001 (symptoms); Chang & Heikemper 2002 **OCEANIA** *Australia*: Koloski et al. 2003 (symptoms)

3.2.6.6. Kidney Stones

Kidney stones are formed primarily from the accumulation of calcium deposits in the stomach, and can be exceedingly painful. The limited research has concluded that males suffer from kidney stones nearly twice as much as females (Daudo et al. 2004:243) (Table 3.2.6.6).

Table 3.2.6.6. Kidney stones.

Nature of Any Difference	Postpubertal	Multiple Age Categories
	Adult	
More in males	**EUROPE** *Sweden*: Leusmann et al. 1990 **NORTH AMERICA** *United States*: Asper 1984; Stamatelou et al. 2003	**EUROPE** *France*: Daudon et al. 2004:243 (~ 2 to 1)
No signif. difference		
More in females		

3.2.6.7. Ulcer/Ulceration

An ulcer is an open break in the skin or mucous membrane, the causes for which are numerous, including chronic emotional stress and bacterial infections. Most of the research on sex differences in ulcers has involved experimentally induced cases in rats. These studies have provided mixed conclusions with respect to which sex is most likely to experience ulcers. Among humans, the available research has either concluded that males have ulcers more or that there is no significant gender difference (Table 3.2.6.7).

Table 3.2.6.7. Ulcer/ulceration.

Nature of Any Difference							Multiple Age Categories
						Adult	
More in males						**RODENT** *Rat*: Ader et al. 1960b (stress resulting from social conflict); Ader 1962 (stress caused by social competition); Sawrey & Long 1962 (stress caused by social conflict)	**NORTH AMERICA** *United States*: Schwab et al. 1974 (diagnosed); Fineberg & Pearlman 1981 (diagnosed); PF Adams & Benson 1991 (diagnosed) **RODENT** *Rat*: Ader et al. 1960b (induced by psychological conflict, diagnosed); Ader et al. 1960c (induced by psychological conflict, diagnosed); Sawrey & Long 1962 (young, induced by psychological conflict, diagnosed)
No signif. difference							**NORTH AMERICA** *United States*: Mendeloff 1980 (ulcerative colitis); Cleary et al. 2004:43*
More in females						**RODENT** *Rat*: Sines 1959 (stress due to immobilization); Ader et al. 1960a (induced by enforced immobilization, diagnosed); Sines 1961 (young, stress due to immobilization)	

3.2.7. Immune Diseases

Diseases of the immune system come in two main forms, immune diseases generally and autoimmune diseases. Findings on sex differences in the incidence of these diseases are reviewed below.

3.2.7.1. Autoimmune Diseases in General

Autoimmune diseases occur when one part of the body reacts to another part as though it is a foreign invader. Table 3.2.7.1 indicates that females are more often than males to be diagnosed with autoimmune diseases in general.

Table 3.2.7.1. Autoimmune diseases in general.

Nature of Any Difference							Multiple Age Categories
						Adult	
Males in more							
No signif. difference							
Females in more						**NORTH AMERICA** *United States*: DL Jacobson et al. 1997; Whitacre 2001 (diagnosed); Whitacre et al. 1999 (diagnosed)	**NORTH AMERICA** *United States*: DL Jacobson et al. 1997 (diagnosed); Cleary et al. 2004:43* (autoimmune problems) **INTERNATIONAL** *Multiple countries*: Ansar Ahmed et al. 1986 (diagnosed); Whitacre et al. 1999

3.2.7.2. Addison's Disease

Addison's disease is a type of autoimmune disease that one study concluded was more prevalent among females than males (Table 3.2.7.2).

Table 3.2.7.2. Addison's disease.

Nature of Any Difference							Multiple Age Categories
More in males							
No signif. difference							
More in females							**NORTH AMERICA** *United States*: Neufeld et al. 1981

3.2.7.3. AIDS (Acquired Immune Deficiency Syndrome)

Acquired Immune Deficiency Syndrome is a disease of the immune system characterized by a reduction in the number of T cells that play a vital role in fighting viral infections. While most studies have shown males to contract AIDS more than females, especially among adults, African countries may mark an exception (Table 3.2.7.3).

Table 3.2.7.3. AIDS (acquired immune deficiency syndrome).

Nature of Any Difference	Prepubertal						Multiple Age Categories
			Early Childhood	Childhood		Adult	
Greater in males			**NORTH AMERICA** *United States*: Centers for Disease Control and Prevention 1997* (Asian/Pacific Islanders, diagnosed)			**EUROPE** *Spain*: M Garcia de la Hera et al. 2004 (death, among drug users) **NORTH AMERICA** *United States*: Centers for Disease Control and Prevention 1997* (Asian/Pacific Islanders, diagnosed)	**LATIN AMERICA** *Brazil*: Lowndes et al. 2000 (death) **NORTH AMERICA** *United States*: Centers for Disease Control 1999 (diagnosed) **INTERNATIONAL** *Several Industrial Societies*: KV Heath et al. 1998 (death); World Health Organization 1998 (death)
No signif. difference				**NORTH AMERICA** *United States*: Centers for Disease Control and Prevention 1997* (Asian/Pacific Islanders, diagnosed)			**AFRICA** *Several Sub-Saharan Countries*: World Health Organization 1998 (death)
Greater in females							**AFRICA** *Several Sub-Saharan Countries*: Glynn 2001 (diagnosis)

3.2.7.4. HIV Infection

The Human Immune-Deficiency Virus (HIV) is the virus that causes AIDS. Persons with HIV will begin producing antibodies within 3-6 months of infection and will normally display flu-like symptoms soon after contracting the disease. Mild fever and fatigue accompanied by headache or rash are common after initial infection. HIV grows rapidly within the body during the first few days after contraction. HIV kills CD 4 lymphocytes (T cells) leaving the body vulnerable to attack from opportunistic diseases. Once the T cell levels become extremely low, a person is considered to have progressed to a full-blown case of AIDS. HIV is transmitted through body fluids such as semen, breast milk, and blood products and can only be passed from infected individuals to others through intimate sexual contact, the sharing of needles, or transfusion. Table 3.2.7.4 suggests that in most countries males are more often diagnosed as HIV positive.

Table 3.2.7.4. HIV infection.

Nature of Any Difference					Postpubertal		Multiple Age Categories
						Adult	
Higher for males						**NORTH AMERICA** *United States*: Gollub et al. 1998 (HIV positive); Otto-Salaj et al. 1998 (HIV positive)	**INTERNATIONAL** *Several Western Countries*: UN AIDS Joint Programme 2000
No signif. difference							
Higher for females						**AFRICA** *Mozambique*: Machel 2001:82 (HIV positive)	

3.2.7.5. Surviving After Diagnosed With HIV

Research on gender differences in survival probabilities following being diagnosed with HIV have suggested that there is either no significant difference or that male survival slightly surpasses that of females (Table 3.2.7.5).

Table 3.2.7.5. Surviving after diagnosed with HIV.

Nature of Any Difference						Postpubertal	Multiple Age Categories
						Adult	
Higher or longer for males						**EUROPE** *Britain*: Reeves & Overton 1988	**INTERNATIONAL** *Several European Countries*: Lundgren et al. 1994
No signif. difference						**EUROPE** *Britain*: Cozzi-Lepri et al. 1994 (controlling for SES and how disease was contracted) **NORTH AMERICA** *United States*: Chaisson et al. 1995 (controlling for age of diagnosis and SES)	
Higher or longer for females							

3.2.7.6. HIV-1 RNA Viral Load

HIV-1 RNA viral load (or simply HIV-1 viral load) refers to the extent to which the AIDS virus has attached to segments of an individual's RNA. As the viral load increases, the body's immune system is weakened. Findings have been mixed with respect to any gender differences in the HIV-1 viral load (Table 3.2.7.6).

Table 3.2.7.6. HIV-1 RNA viral load.

Nature of Any Difference					Postpubertal		Multiple Age Categories
					Adolescent	Adult	
Higher for males							**NORTH AMERICA** *United States*: Rosenberg 1995 (diagnosed); Katzenstein et al. 1996 (diagnosed); Farzadegan et al. 1998 (diagnosed)
No signif. difference						**EUROPE** *Switzerland*: Junghans et al. 1999	**NORTH AMERICA** *United States*: CE Bush et al. 1996 (diagnosed); Moore et al. 1999 (diagnosed)
Higher for females					**AFRICA** *Tanzania*: Chum et al. 1994* (tuberculosis patients); *Zambia*: AM Elliott et al. 1990* (tuberculosis patients)	**AFRICA** *Tanzania*: Chum et al. 1994* (young adult tuberculosis patients); *Zambia*: AM Elliott et al. 1990* (young adult tuberculosis patients) **EUROPE** *Britain*: Farzadegan et al. 1998; AL Moore et al. 2001	

3.2.7.7. Allergies

Research findings on sex differences in allergies have been mixed, with the possibility of age being a confounding factor. As shown in Table 3.2.7.7, males seem to be more susceptible to allergies early in life, while females tend to exhibit symptoms more as they approach and mature beyond puberty.

Table 3.2.7.7. Allergies.

Nature of Any Difference	Sub-adolescent				Postpubertal		Multiple Age Categories
			Early Childhood	Childhood	Adolescent	Adult	
Males more			**ASIA** *Hong Kong*: Leung et al. 1997* (diagnosed) **EUROPE** *Belgium*: Wierenga et al. 1999 (respiratory & nasal symptoms, diagnosed); *Britain*: A Ross & Flemig 1994* (diagnosed)	**EUROPE** *Slovakia*: Ostathikova et al. 2002:11 (diagnosed)			
No signif. difference				**EUROPE** *Belgium*: Wierenga et al. 1999* (respiratory & nasal symptoms, diagnosed) **NORTH AMERICA** *United States*: Achenbach & Edelbrock 1981:14* (diagnosed)	**EUROPE** *Sweden*: Norrman et al. 1994 (diagnosed) **NORTH AMERICA** *United States*: Achenbach & Edelbrock 1981:14* (diagnosed); Benbow 1986 (diagnosed)	**NORTH AMERICA** *United States*: Hagy & Settipane 1969 (young, diagnosed)	**NORTH AMERICA** *United States*: Charpin et al. 1988 (diagnosed); Cleary et al. 2004:43* (hayfever)
Females more			**EUROPE** *Belgium*: Wierenga et al. 1999* (skin symptoms, diagnosed)	**ASIA** *Hong Kong*: Leung et al. 1997* (diagnosed) **EUROPE** *Belgium*: Wierenga et al. 1999* (skin symptoms, diagnosed); *Britain*: A Ross & Flemig 1994* (diagnosed)			**EUROPE** *Finland*: Kanerva et al. 1994 (diagnosed) **NORTH AMERICA** *Canada*: Walters et al. 2002:687 **OCEANIA** *New Zealand*: Montefort et al. 1998 (diagnosed); D'Souza et al. 1999 (diagnosed) **RODENT** *Mouse*: Yamamoto et al. 2001 (diagnosed)

3.2.7.8. Autoimmune Polyglandular Syndrome

The autoimmune polyglandular syndrome refers to autoimmune disorders of at least three types (Types 1, 2, and 3). Findings have been inconsistent regarding gender differences in the prevalence of the Type 1 form of this syndrome (Table 3.2.7.8).

Table 3.2.7.8. Autoimmune polyglandular syndrome.

Nature of Any Difference				Postpubertal		Multiple Age Categories
				Adolescent		
Males more				**NORTH AMERICA** *United States*: Muir & Maclaren 1991		**EUROPE** *Finland*: Ahonen et al. 1990 (Type 1)
No signif. difference						
Females more						**EUROPE** *Italy*: Betterle et al. 1998 (Type 1) **NORTH AMERICA** *United States*: Neufeld et al. 1981 (Type 1)

3.2.7.9. Bullous Pemphigoid

Bullous pemphigoid is a skin disease typified by the formation of large blisters. The available studies have failed to detect any significant gender differences in the development of this disorder (Table 3.2.7.9).

Table 3.2.7.9. Bullous pemphigoid.

Nature of Any Difference	Prepubertal					Multiple Age Categories
			Childhood			
Males more						
No signif. difference			**NORTH AMERICA** *United States*: Robison & Odom 1978			**NORTH AMERICA** *United States*: WF Lever 1965:78; Diaz et al. 1985
Females more						

3.2.7.10. Dermatomyositis

Dermatomyositis is a disease of the connective tissue between skin and muscle cells. All of the available research has concluded that this disease is more common among females than males (Table 3.2.7.10).

Table 3.2.7.10. Dermatomyositis.

Nature of Any Difference	Prepubertal	Postpubertal	
	Childhood	Adolescent	Adult
Males more			
No signif. difference			
Females more	**NORTH AMERICA** *United States*: HM Roberts & Brunsting 1954; JJ Miller 1973	**NORTH AMERICA** *United States*: Pachman et al. 1985	**NORTH AMERICA** *United States*: MH Brooke 1991

3.2.7.11. Goiter

Goiter is an enlargement of the thyroid gland. This occurs when the thyroid gland cannot produce enough thyroid hormone for the body. In all of the studies cited in Table 3.2.7.11, females were found to be more apt to have this condition than were males.

Table 3.2.7.11. Goiter.

Nature of Any Difference	Prepubertal	Multiple Age Categories
	Childhood	
Males more		
No signif. difference		
Females more	**MIDDLE EAST** *Iran*: Bazrafshan et al. 2005	**LATIN AMERICA** *Ecuador*: LS Greene 1973 **NORTH AMERICA** *United States*: Trowbridge et al. 1975 **INTERNATIONAL** *Multiple Countries*: Delange 2000

3.2.7.12. Goodpasture's Syndrome

Goodpasture's syndrome is a life-threatening autoimmune disease primarily affecting the lungs and kidneys. The one available study concluded that this disorder is more common in males than in females (Table 3.2.7.12).

Table 3.2.7.12. Goodpasture's syndrome.

Nature of Any Difference	Multiple Age Categories
Males more	**NORTH AMERICA** *United States*: Couser 1992
No signif. difference	
Females more	

3.2.7.13. Hashimoto's Thyroiditis/Struma Lymphomatosa

Hashimoto's thyroiditis (also called struma lymphomatosa) is an autoimmune disorder primarily affecting the thyroid gland. The one study located pertaining to gender differences in this disorder concluded that females suffered to a greater extent than males (Table 3.2.7.13).

Table 3.2.7.13. Hashimoto's thyroiditis/struma lymphomatosa.

Nature of Any Difference	Postpubertal
	Adult
Males more	
No signif. difference	
Females more	**NORTH AMERICA** *United States*: P Larsen 1992

3.2.7.14. Henoch-Schonlein Purpura

Henoch-Schonlein purpura is a disease resulting from an abnormal response of the immune system. It is characterized by a purple rash (purpura) starting on the lower extremities and rising only to the groin area, joint pain, and swelling, and may have gastrointestinal symptoms as well. The available research has shown that this disease is more prevalent in males than in females (Table 3.2.7.14).

Table 3.2.7.14. Henoch-schonlein purpura.

Nature of Any Difference	Prepubertal				Postpubertal		
				Childhood		Adult	
Males more				**NORTH AMERICA** *United States*: M Levy et al. 1976 (diagnosed); Fauci 1980 (diagnosed)		**NORTH AMERICA** *United States*: Cream et al. 1970 (diagnosed); Fogazzi et al. 1989 (diagnosed)	
No signif. difference							
Females more							

3.2.7.15. IgA Nephropathy

IgA nephropathy is a disease resulting from abnormal deposits of the protein immunoglobulin A inside the kidneys. As shown in Table 3.2.7.15, this disease appears to be more common in males than in females.

Table 3.2.7.15. IgA nephropathy.

Nature of Any Difference							Multiple Age Categories
Males more							**NORTH AMERICA** *United States*: D'Amico et al. 1985
No signif. difference							
Females more							

3.2.7.16. Lupus

Lupus is a chronic autoimmune disease that typically affects the skin, blood, kidneys, and joints. Persons with lupus have an immune system that is unable to make a distinction between foreign substances and normal body tissues or cells. The immune system will then attack these areas with auto-antibodies, causing a reaction and forming immune complexes that build up in the tissues and cause inflammation accompanied by pain. As shown in Table 3.2.7.16, studies have consistently found females exhibiting higher rates of lupus than males. This is not only true of humans but also of mice.

Table 3.2.7.16. Lupus.

Nature of Any Difference	Prepubertal				Postpubertal		Multiple Age Categories
				Childhood		Adult	
More in males							
No signif. difference							
More in females				**NORTH AMERICA** *United States*: Kornreich 1976 (diagnosed); JG Schaller 1989		**NORTH AMERICA** *United States*: Fessler et al. 2005:1475; Merislin & Rothfield 1968; Hahn 1980; Liang & Karlson 1996; Molina et al. 1996; DL Jacobson et al. 1999 (adult) **RODENT** *Mouse*: JD Jacobson et al. 1999 (diagnosed)	**ASIA** *China*: Liu et al. 2002:176 (diagnosed) **NORTH AMERICA** *United States*: EL DuBois & Tuffanelli 1964 (diagnosed); Inman 1978 (diagnosed); Masi & Kaslow 1978 (diagnosed); DL Jacobson et al. 1997 (diagnosed); V Rider 1998 (diagnosed); Whitacre et al. 1999 (diagnosed) **RODENT** *Mouse*: Roubinian et al. 1979 (diagnosed)

3.2.7.17. Myasthenia Gravis

Myasthenia gravis is a chronic autoimmune disorder that causes weakness of the muscles due to the destruction of acetylcholine receptor cells. Antibodies designed to attack foreign or harmful objects instead attack these cells resulting in loss of muscle control and fatigue in the affected muscle groups. Typically, a person with myasthenia gravis will first show symptoms in the muscles that control the eyes and eyelids. Sometimes, the disease goes on to affect other areas of the body. Myasthenia gravis normally is not life threatening but in rare cases the muscles associated with respiration are targeted causing complications with breathing that are potentially fatal. Most studies have found that females are more often diagnosed with myasthenia gravis except for cases diagnosed in childhood (Table 3.2.7.17).

Table 3.2.7.17. Myasthenia gravis.

Nature of Any Difference	Prepubertal				Postpubertal		Multiple Age Categories
				Childhood	Adolescent		
More in males							
No signif. difference				**MIDDLE EAST** *Turkey*: Haliloglu et al. 2002* (diagnosed) **NORTH AMERICA** *United States*: PI Andrews et al. 1994* (diagnosed); Evoli et al. 1998* (diagnosed)			
More in females					**NORTH AMERICA** *United States*: Millichap & Dodge 1960 (diagnosed); Arnason 1980; Snead et al. 1980 (diagnosed); Adams et al. 1990 (diagnosed)		**EUROPE** *Yugoslavia*: Lavrnic et al. 1999 (diagnosed, following puberty) **MIDDLE EAST** *Turkey*: Haliloglu et al. 2002* (diagnosed, following puberty) **NORTH AMERICA** *United States*: Afifi & Bell 1993 (diagnosed, following puberty); PI Andrews et al. 1994* (diagnosed, following puberty); Evoli et al. 1998* (diagnosed, following puberty)

3.2.7.18. Pemphigus Vulgaris

Pemphigus vulgaris is an immune skin disorder typified by bumps on the nose and face. As shown in Table 3.2.7.18, neither of the two available studies of sex differences found the differences to be significant.

Table 3.2.7.18. Pemphigus vulgaris.

Nature of Any Difference					Postpubertal		
						Adult	
Males more							
No signif. difference						**NORTH AMERICA** *United States*: WF Lever 1965; Korman 1988	
Females more							

3.2.7.19. Polyarteritis Nodosa

Polyarteritis nodosa is an autoimmune disease in which the blood vessels swell. The one available study concluded that this disease affected men more than women (Table 3.2.7.19).

Table 3.2.7.19. Polyarteritis nodosa.

Nature of Any Difference					Postpubertal		
						Adult	
Males more						**NORTH AMERICA** *United States*: Wolff 1992	
No signif. difference							
Females more							

3.2.7.20. Polymyositis

Polymyositis is a muscle inflammatory disease associated with decreased muscle power that mainly affects muscles closest to the trunk. Many people with this disease find it hard to rise from a sitting position or lift objects. One study concluded that this condition is more common among females than among males (Table 3.2.7.20).

Table 3.2.7.20. Polymyositis.

Nature of Any Difference							Multiple Age Categories
Males more							
No signif. difference							
Females more							**NORTH AMERICA** *United States*: MH Brooke 1991 (diagnosis)

3.2.7.21. Sarcoidosis

Sarcoidosis is an immune disorder characterized by outgrowths on blood vessels and connective tissue of the body. As shown in Table 3.2.7.21, two studies have found this disorder to be more common in females than in males.

Table 3.2.7.21. Sarcoidosis.

Nature of Any Difference							Multiple Age Categories
Males more							
No signif. difference							
Females more							**NORTH AMERICA** *United States*: RG Fraser et al. 1991 (diagnosis); JL Troy & Goetz 1991(diagnosis)

3.2.8. Diseases of the Nervous System

Diseases of the nervous system are those that involve the brain or spinal cord. Findings that pertain to these diseases reveal a complex pattern of sex differences.

3.2.8.1. Alzheimer’s Disease

Alzheimer’s disease is a progressively worsening brain disorder resulting in gradual loss of memory and other intellectual capabilities along with deficiencies in motor control. The exact causes of the disease are unknown, although symptoms are almost entirely confined to the elderly. Alzheimer’s disease cannot be diagnosed with certainty until after death and subsequent examination of brain tissue, but diagnosis based on the various above-named behavioral symptoms is normally accurate.

According to Table 3.2.8.1, whenever a sex difference has been found with respect to Alzheimer’s disease, females have been found to manifest higher rates than males. This can be partly understood in terms of the fact that females typically live longer than do males.

Table 3.2.8.1. Alzheimer's disease.

Nature of Any Difference					Postpubertal		Multiple Age Categories
						Adult	
Males more							
No signif. difference						**EUROPE** *Britain*: Paykel et al. 1994 (older than 75); *France*: Letenneur et al. 1994 (elderly, diagnosed) **NORTH AMERICA** *Canada*: J Lindsay et al. 2002 (elderly, diagnosed); *United States*: BS Schoenberg et al. 1987 (elderly, diagnosis); Kokmen et al. 1988 (elderly, diagnosis); DL Bachman et al. 1993 (elderly, diagnosis); Rocca et al. 1998 (elderly, diagnosis); Tang et al. 1998:751 (diagnosed); Ganguli et al. 2000 (elderly, rural); Herbert et al. 2001 (elderly, diagnosed); Miech et al. 2002 (persons in their 90s); LL Barnes et al. 2003 (elderly, Catholic Clergy, age controlled, diagnosed)	
Females more						**ASIA** *China*: W Wang et al. 2000 (over 65); *Japan*: Yoshitake et al. 1995 (elderly, diagnosis); *India*: Chandra et al. 2001 (over 65, rural); Vas et al. 2001 (over 40) **EUROPE** *Britain*: Brayne et al. 1995 (elderly); *Germany*: Ott et al. 1998 (elderly); *Italy*: Di Cario et al. 2002; *Norway*: Amaducci et al. 1992 (elderly, diagnosis); Fratiglioni et al. 1997 (extreme elderly, diagnosis);*Spain*: Letenneur et al. 1999 (elderly); *Sweden*: Fratiglioni et al. 1997 (extremely elderly, diagnosed); *Several European Countries*: Rocca et al. 1991 (elderly, diagnosis); K Andersen et al. 1999 (age controlled) **NORTH AMERICA** *Canada*: Canadian Study of Health & Aging Working Group 1994 (age controlled);Rockwood et al. 2000; J Lindsay et al. 2002 (elderly); *United States*: MK Aronson et al. 1990 (elderly, diagnosis); DL Bachman et al. 1992 (elderly, diagnosis); Rao et al. 1994; Hebert et al. 1995 (elderly, diagnosis, age controlled); Buckwalter et al. 1996 (elderly, diagnosis); Payami et al. 1996 (elderly, diagnosis); Lai et al. 1999 (Down's syndrome sufferers, diagnosis); Kawas et al. 2000 (elderly); Lapane et al. 2001 (elderly); Miech et al. 2002 (extreme elderly); LL Barnes et al. 2003 (extremely elderly); Paoletti et al. 2004 (elderly)	**NORTH AMERICA** *Canada*: Munoz et al. 2000:87 (diagnosed); *United States*: Hebert et al. 2001 (diagnosis)

3.2.8.2. Age of Onset for Alzheimer's Disease

One study of the age at which persons with Alzheimer's disease first begin to exhibit symptoms of the disease concluded that females did so at a younger average age than males (Table 3.2.8.2).

Table 3.2.8.2. Age of onset for Alzheimer's disease.

Nature of Any Difference					Postpubertal	
						Adult
Males earlier						
No signif. difference						
Females earlier						**NORTH AMERICA** *United States*: G Dal Forno et al. 2005

3.2.8.3. Dementia/Senility

Dementia refers to a general decline in mental faculties that accompany old age (often including Alzheimer's disease). As shown in Table 3.2.8.3, there are either no significant gender differences in the diagnosis of dementia or females are more often so diagnosed than males.

Table 3.2.8.3. Dementia.

Nature of Any Difference					Postpubertal		Mulitple Age Categories
						Adult	
Males more							
No signif. difference						**EUROPE** *Britain*: DL Bachman et al. 1993 (elderly, diagnosis); Paykel et al. 1994 (elderly, diagnosis) **NORTH AMERICA** *United States*: Rocca et al. 1998 (elderly, diagnosis)	
Females more						**EUROPE** *Britain*: J Archer & Lloyd 1985 (diagnosed, senile); Brayne et al. 1995 (elderly, diagnosis); *Several European Countries*: K Andersen et al. 1999 (elderly, diagnosis, age controlled); *Spain*: Garcia Garcia et al. 2001 (elderly); *Sweden*: Aguero-Torres et al. 1998 (elderly) **NORTH AMERICA** *United States*: Fitting et al. 1986 (elderly, diagnosis); Kaye & Applegate 1990 (elderly, diagnosis); Mega et al. 1996 (diagnosis); Commenges et al. 1998 (elderly, diagnosis); OL Lopez et al. 2003; LL Barnes et al. 2005 (elderly)	**NORTH AMERICA** *United States*: Bachman et al. 1993 (ages 70-74)

3.2.8.4. Vascular Dementia

Vascular dementia is a type of dementia resulting primarily from blockages of the arteries feeding blood to the brain. As shown in Table 3.2.8.4, this disorder appears to be more common in males than in females.

Table 3.2.8.4. Vascular dementia.

Nature of Any Difference						
					Postpubertal	
						Adult
Males more						**NORTH AMERICA** *Canada*: Rockwood et al. 2000 (diagnosis); OL Lopez et al. 2003 (diagnosis)
No signif. difference						
Females more						

3.2.8.5. Amyotrophic Lateral Sclerosis (Lou Gehrig's Disease)

Amyotrophic lateral sclerosis (ALS), also called Lou Gehrig's disease, causes a progressive loss of motor control due to gradual deterioration of motor nerves in the brain and spinal cord. According to Table 3.2.8.5, this disease is more common in males than in females except possibly among the elderly (where no significant gender difference was found).

Table 3.2.8.5. Amyotrophic lateral sclerosis (Lou Gehrig's disease).

Nature of Any Difference							Multiple Age Categories
					Postpubertal		
						Adult	
Males higher						**NORTH AMERICA** *United States*: Haverkamp et al. 1995* (except elderly, diagnosis) **RODENT** *Mouse*: Veldink et al. 2003:741 (diagnosis)	**NORTH AMERICA** *United States*: WB Matthews 1987 (diagnosis)
No signif. difference						**NORTH AMERICA** *United States*: Haverkamp et al. 1995* (elderly, diagnosis)	
Females higher							

3.2.8.6. Epilepsy

Epilepsy is characterized by sudden intense bursts of electrical discharges in the brain, often resulting in lost muscle control and consciousness (a phenomenon known as seizures or fits). Epilepsy affects approximately 2 million people in the United States (~1%) with the greatest number of cases occurring in young children and in people over 60 years of age. As shown in Table 3.2.8.6, findings pertaining to the prevalence of epilepsy according to sex have been mixed, although most studies have found higher rates of most forms of epilepsy among males.

Table 3.2.8.6. Epilepsy.

Nature of Any Difference	Prepubertal						Multiple Age Categories
		Toddler		Childhood			
Males higher		**EUROPE** *Britain*: Taylor & Ounted 1971 (diagnosis)		**EUROPE** *Italy*: Cavazzuti 1980 (diagnosed); Benna et al. 1984 (diagnosed); *Germany*: Doose & Sitepu 1983 (diagnosed) **NORTH AMERICA** *United States*: Shamansky & Gleaser 1979 (diagnosed); Cowan et al. 1989 (diagnosed)			**AFRICA** *Nigeria*: Osuntokun et al. 1987 (diagnosed) **EUROPE** *Britain*: Crombie et al. 1960 (diagnosed); *Denmark*: Henriken et al. 1970 (diagnosed); Juul-Jensen & Foldspang 1983 (diagnosed); *Italy*: Granieri et al. 1983 (diagnosed); *Norway*: De Graaf 1974 (diagnosed); *Poland*: Zielinski 1974 (death); *Sweden*: Joensen 1986 (diagnosed); *Switzerland*: Penning et al. 1969 (death) **MIDDLE EAST** *India*: Bharucha et al. 1988 (diagnosed) **NORTH AMERICA** *United States*: Danby 1934; WA Hauser & Kurland 1975 (diagnosed); WA Hauser et al. 1980 (death); Annegers & Hauser 1984 (diagnosed); Haerer et al. 1986 (diagnosed); Commission on Classification & Terminology 1989 (diagnosed); Hauser 1992 (diagnosis) **OCEANIA** *Guam*: Stanhope et al. 1972 (diagnosed); *Mariana Islands*: Mathai et al. 1968 (diagnosed) **RODENT** *Rat*: Jando et al. 1995 (diagnosed)
No signif. difference							**MIDDLE EAST** *India*: Nandi et al. 1979:286 (diagnosed)
Females higher							**AFRICA** *Nigeria*: Osuntokun et al. 1982 (diagnosed) **EUROPE** *Germany*: Janszky et al. 2004 (medial temporal lobe epilepsy, diagnosis); *Iceland*: Gudmundsson 1963 (diagnosed)

3.2.8.7. Guillain-Barre Syndrome

Guillain-Barre syndrome is an inflammatory disorder involving the peripheral nervous system characterized by sudden weakness and paralysis of the extremities. Only one study of sex differences in this disorder was located. It suggested that males contract this disorder more than do females (Table 3.2.8.7).

Table 3.2.8.7. Guillain-Barre syndrome.

Nature of Any Difference					Postpubertal	
						Adult
Males higher						**EUROPE** *Sweden*: Cheng et al. 2000
No signif. difference						
Females higher						

3.2.8.8. Seizure/Convulsion Frequency/Severity

Seizures are the result of abnormal electrical bursts in the brain and can be associated with a loss of consciousness in the patient or any combination of the following symptoms: violent body tremor, mild body tremor, loss of awareness, unresponsive behavior, loss of motor function, loss of muscle control, or altered mental status. If seizures persist, affected individuals receive the diagnosis of being epileptic. The findings reviewed in Table 3.2.8.8 indicate there is no consistent pattern with respect to gender differences in seizure frequency or severity.

Table 3.2.8.8. Seizure/convulsion frequency/severity.

Nature of Any Difference					Postpubertal		Multiple Age Categories
						Adult	
More in males						**EUROPE** *Sweden*: Forsgren et al. 1990 (convulsions associated with high fever) **RODENT** *Rat*: Kokka et al. 1992* (seizure induced by electroshock, diagnosed)	**EUROPE** *Sweden*: Janszky et al. 2004 (more rapid spread of seizing areas among epileptics)
No signif. difference						**RODENT** *Rat*: Teskey et al. 1999:680 (diagnosed)	
More in females						**RODENT** *Rat*: Werboff & Corcoran 1961 (diagnosed); Kokka et al. 1992* (GABA_A receptor-chloride channel complex blocker induced, diagnosed)	**RODENT** *Rat*: Laidlaw 1956 (diagnosed)

3.2.8.9. Parkinson's Disease

Parkinson's disease is a degenerative muscular disease for which several studies of possible sex differences are available. Most of these studies suggest that the condition is more common among males than females (Table 3.2.8.9).

Table 3.2.8.9. Parkinson's disease.

Nature of Any Difference					Postpubertal		Multiple Age Categories
						Adult	
Males higher						**EUROPE** *Germany*: Grundl et al. 1991* (more brain atrophy seen in CT scan) **NORTH AMERICA** *Canada*: LW Swenson 1991; *United States*: Mayeux et al. 1995; Van den Eeden et al. 2003 (diagnosed) **RODENT** *Rat*: WA Cass et al. 2005 (24 month old adult males, greater decrease in vertical & horizontal activity in rat Parkinson model animals)	**INTERNATIONAL** *Multiple Countries*: Lilienfeld et al. 1990
No signif. difference							
Females higher						**EUROPE** *Germany*: Grundl et al. 1991* (more lacunar lesions seen around ventricles in CT scan)	

3.2.8.10. Prosopagnosia (Visual Agnosia)

Prosopagnosia has to do with the loss of the ability to recognize the import of sensory stimuli, even with good vision. Sufferers of this neurological disorder have special problems recognizing faces of people who were once very familiar to them. The one available study found prosopagnosia to be more common in males than in females (Table 3.2.8.10).

Table 3.2.8.10. Prosopagnosia (visual agnosia)

Nature of Any Difference							Multiple Age Categories Category
Males more							**NORTH AMERICA** *United States*: Mazzucchi & Biber 1983
No signif. difference							
Females more							

3.2.8.11. Sydenham's Chorea

Sydenham's chorea is a neurological disorder that involves involuntary contractions of the muscles of the face and/or limbs. The available research suggests that this disease is roughly twice as common in females as in males (Table 3.2.8.11).

Table 3.2.8.11. Sydenham's chorea.

Nature of Any Difference	Prepubertal						Multiple Age Categories
				Childhood			
Males more							
No signif. difference							
Females more				**NORTH AMERICA** *United States*: Schwartzman et al. 1948			**NORTH AMERICA** *United States*: AM Aron et al. 1965

3.2.8.12. Tardine Dyskinesia

Tardine dyskinesia is a neurological disease resulting in involuntary rhythmic movements of the mouth and tongue. Table 3.2.8.12 shows that the one available study of sex differences concluded that the condition is more common in females than in males.

Table 3.2.8.12. Tardine dyskinesia.

Nature of Any Difference							Multiple Age Categories
More in males							
No signif. difference							
More in females							**NORTH AMERICA** *United States*: Kane & Smith 1982

3.2.9. Diseases of the Muscular-Skeletal System

Muscular-skeletal diseases are those that adversely affect the ability of the body to move or maintain proper posture. Sex differences in these diseases are reviewed below.

3.2.9.1. Muscular-Skeletal Diseases in General

Muscular-skeletal diseases affect the bones and muscles of the body, also called the musculoskeletal system. The list of diseases that affect these structures is numerous and ranges from the relatively innocuous such as bursitis to more serious debilitating or life threatening disorders such as rhabdomyosarcoma (cancer of the muscle tissue). Table 3.2.9.1 describes the likelihood of being diagnosed with a muscular-skeletal disease according to gender and age. It suggests that prior to adulthood, males are more likely to be diagnosed with such diseases, but that thereafter there is either no significant sex difference or females receive these diagnoses more.

Table 3.2.9.1. Muscular-skeletal diseases in general.

Nature of Any Difference	Prepubertal				Postpubertal		Multiple Age Categories
				Childhood	Adolescent	Adult	
Males more				**NORTH AMERICA** *United States*: Hannaford 1966:32* (diagnosis)	**EUROPE** *Britain*: Fairbank et al. 1984b (diagnosed) **NORTH AMERICA** *United States*: Hannaford 1966:32* (diagnosis)	**NORTH AMERICA** *United States*: Hannaford 1966:32* (diagnosis)	
No signif. difference						**NORTH AMERICA** *United States*: Koplan et al. 1982; SJ Jacobs & Berson 1986; Lanese et al. 1990; ML Ireland 1994	**NORTH AMERICA** *United States*: SN Blair et al. 1987; Macera et al. 1989 (among runners); SD Walter et al. 1989 (among runners)
Females more						**NORTH AMERICA** *United States*: Hannaford 1966:32* (consultation, elderly); JS Cox & Lenz 1979; JS Cox & Lenz 1984; BH Jones et al. 1992; Almeida et al. 1999 (exercise related)	**EUROPE** *Finland*: Rekola et al. 1993 (diagnosed); *Sweden*: Linton 1990 (diagnosed) **NORTH AMERICA** *United States*: H Taylor & Curran 1985 (diagnosed)

3.2.9.2. Arthritis in General

Arthritis is a disease involving the inflammation of joints often causing pain, redness, and swelling. Osteoarthritis is the most commonly diagnosed form of arthritis in most countries and is often the result of years of physical stress placed upon the joints combined with genetic susceptibility along with the aging process. Rheumatoid arthritis is an autoimmune disorder that affects both children and adults. There is no identified cause for RA but genetics, infection, hormones, and diet all appear to play a role. Other forms of arthritis include gout, septic arthritis, and non-gonococcal bacterial arthritis. Females are consistently more likely to be diagnosed with arthritis than are males (Table 3.2.9.2).

Table 3.2.9.2. Arthritis in general.

Nature of Any Difference					Postpubertal		Multiple Age Categories
						Adult	
More in males							
No signif. difference							
More in females						**ASIA** *China*: Zhang et al. 2003 **LATIN AMERICA** *Brazil*: Barreto et al. 2004 (elderly) **NORTH AMERICA** *United States*: DT Felson et al. 1995 (elderly); D L Jacobson et al. 1997 (adults); Affleck et al. 1999 (elderly, self-reported)	**EUROPE** *Spain*: Narvaez et al. 2002 (polymyalgia rheumatica & temporal arthritis) **MIDDLE EAST** *Israel*: Sonneblick et al. 1994 **NORTH AMERICA** *Canada*: Walters et al. 2002:687; *United States*: Machado et al. 1988 (temporal arthritis); Simoni-Wastila 2000:291 (self-report)

3.2.9.3. Fibromyalgia

Fibromyalgia is a condition causing chronic musculoskeletal pain with tender points and fatigue. Studies have shown fibromyalgia to be more common among females than males (Table 3.2.9.3).

Table 3.2.9.3. Fibromyalgia.

Nature of Any Difference					Postpubertal		Multiple Age Categories
						Adult	
More males							
No signif. difference							
More females						**NORTH AMERICA** *United States*: DW Russ & Kert-Braun 2003 (young adult more resistant to muscle fatigue)	**EUROPE** *Britain*: Furnham & Kirkcaldy 1997; *Germany*: Kirkaldy et al. 2003:54 (adolescent) **NORTH AMERICA** *United States*: Langemark et al. 1989 (diagnosis); Mountz et al. 1995 (diagnosis); F Wolfe et al. 1995

3.2.9.4. Gout

Gout is a form of arthritis associated with the formation of uric acid crystals in the one or more specific joints, most commonly in the big toe. As shown in Table 3.2.9.4, the available evidence is that men suffer from gout much more than do women. This makes it quite unique as a type of arthritis. Rarely do female sufferers experience symptoms prior to menopause, whereas most male sufferers have symptoms by age 45.

Table 3.2.9.4. Gout.

Nature of Any Difference					Postpubertal		
						Adult	
More in males						**NORTH AMERICA** *United States*: Mikkelson et al. 1965; JB O'Sullivan 1972; RC Lawrence et al. 1989	
No signif. difference							
More in females							

3.2.9.5. Multiple Sclerosis

Multiple sclerosis is a disease of the brain and spinal cord characterized by the disintegration of the myelin sheath or coating for nervous fibers. As the myelin sheath begins to deteriorate, electrical impulses are slowed resulting in impaired nerve conduction. Persons with multiple sclerosis often experience symptoms that include the sensation of "pins and needles" on the skin or more severe physical conditions including the loss of muscle control. Table 3.2.9.5 indicates that with the possible exception of adolescence, when no significant sex difference was found, multiple sclerosis is more common in females than in males.

Table 3.2.9.5. Multiple sclerosis.

Nature of Any Difference	Prepubertal				Postpubertal		Multiple Age Categories
			Early Childhood		Adolescent	Adult	
More in males							
No signif. difference					**MIDDLE EAST** *Turkey*: Haliloglu et al. 2002 (diagnosed)		
More in females			**EUROPE** *Italy*: Ruggieri et al. 1999 (diagnosed)			**EUROPE** *France*: Duquette & Girard 1993; *Netherlands*: Eikelenboom et al. 2005; *Sardinia*: A Goris et al. 2002 **NORTH AMERICA** *United States*: Zorgdrager & DeKeyser 1997; Voskuhe 2002 **OCEANIA** *Australia*: SR Hammond et al. 1987	**ASIA** *Thailand*: Jitpimolmard & Vejiallova 1994 (diagnosed) **EUROPE** *Denmark*: Koch-Henriksen et al. 1992 (diagnosed); *Hungary*: Pal et al. 2002 **NORTH AMERICA** *United States*: HM Baum & Rothschild 1981 (diagnosed); Kurtzke 1983; GS Francis et al.1991; DL Jacobson et al. 1997

3.2.9.6. Osteoarthritis

Osteoarthritis is a chronic form of arthritis associated with a deterioration of cartilage at the joints coupled with the formation of bone spurs. Genetic factors are among the causes of osteoarthritis while the aging process plays a part in the progression of the disease. Osteoarthritis tends to appear in the joints of the hips, knees, and fingers of elderly individuals. Table 3.2.9.6 shows females are more likely to be diagnosed with this disease.

Table 3.2.9.6. Osteoarthritis.

Nature of Any Difference					Postpubertal		Multiple Age Categories
						Adult	
More in males							
No signif. difference						**NORTH AMERICA** *United States*: Jonsson et al. 1999* (in DIPs); Nakamura et al. 2001* (in DIPs)	**NORTH AMERICA** *United States*: J Roberts & Burch 1966 (diagnosed)
More in females						**ASIA** *Russia*: Kalichman et al. 2004 (DIPs and PIPs) **EUROPE** *Germany*: J Smith & M Baltes 1998 (elderly, diagnosed) **NORTH AMERICA** *United States*: Fries et al. 1980 (elderly); MA Davis 1981 (symptoms); Deighton et al. 1992 (elderly); Chaisson et al. 1997; Jonsson et al. 1999* (in CMC1); Nakamura et al. 2001* (in CMC1); Murtagh & Hubert 2004 (elderly)	**NORTH AMERICA** *United States*: MA Davis 1981 (diagnosed); DT Felsen 1988 (diagnosed); Verbrugge 1995 (diagnosed)

3.2.9.7. Osteoporosis

Osteoporosis, or major thinning of the bones, is a metabolic bone disease. It occurs when too much bone mass is absorbed by the body or not enough bone mass is produced. Inadequate amounts of phosphate and calcium as well as hormonal deficiencies contribute to the progression of the disease. In women, osteoporosis most commonly occurs following menopause. Some additional causes of osteoporosis are Cushing's syndrome, hypothyroidism, and bone malignancies. With the possible exception of osteoporosis specifically involving the vertebrae, all of the available research indicates that females suffer from this disease to a greater extent than do males, even among nonhuman primates (Table 3.2.9.7).

Table 3.2.9.7. Osteoporosis.

Nature of Any Difference	Postpubertal		
		Adult	
More in males			
No signif. difference		**EUROPE** *Several European Countries*: T O'Neill et al. 1996* (elderly, vertebral osteoporosis, diagnosed)	
More in females		**EUROPE** *Britain*: G Jones et al. 1994a (elderly, diagnosed); G Jones et al. 1994b (elderly, diagnosed) **NORTH AMERICA** *United States*: BL Riggs et al. 1981 (elderly, diagnosed); Farmer et al. 1984 (elderly); Riggs & Melton 1986 (elderly, diagnosed); Furstenberg & Mezey 1987 (elderly); Ruff & Hayes 1988 (long bones); Birge 1993 (elderly); Greenspan et al. 1994 (elderly); Eastell 1996 (elderly, diagnosed); Greendale et al. 1997 (elderly, diagnosed); Looker et al. 1997 (elderly, diagnosed); Melton 1997; Khosla et al. 1998 (elderly, diagnosed); Melton et al. 1998 (elderly, diagnosed); Melton et al. 2000 (elderly, diagnosed); Melton et al. 2002 (elderly); Murtagh & Hubert 2004 (elderly, diagnosed); Cleary et al. 2004:43* (arthritis and other joint diseases) **PRIMATE (EXCEPT APE)** *Baboon*: Aufdemorte et al. 1993 (elderly, diagnosed); Havill et al. 2004 (diagnosed); *Rhesus Macaque*: Cerroni et al. 2000 (diagnosed)	

3.2.9.8. Polychondritis

Polychondritis (or relapsing polychondritis) is a type of inflammation of cartilage tissue. Its causes are unknown, but they are thought to involve some autoimmune factors. The available research has found no significant sex difference in the prevalence of polychondritis (Table 3.2.9.8).

Table 3.2.9.8. Polychondritis.

Nature of Any Difference					Postpubertal		
						Adult	
Males more							
No signif. difference						**NORTH AMERICA** *United States*: JH Herman 1989 (diagnosis)	
Females more							

3.2.9.9. Rheumatoid Arthritis

Rheumatoid arthritis is an autoimmune disease affecting the body's joints. It is more common among females than males according to all available research (Table 3.2.9.9), with the exception of a rare form of the disease known as *ankylosing spondylitis* (see next table).

Table 3.2.9.9. Rheumatoid arthritis.

Nature of Any Difference					Postpubertal		Multiple Age Categories
					Adolescent	Adult	
More males							
No signif. difference						**NORTH AMERICA** *United States*: Murtagh & Hubert 2004:1409 (elderly)	
More females					**NORTH AMERICA** *United States*: Calabro & Marchesano 1968 (diagnosis); RC Williams 1980 (diagnosis); JT Cassidy 1989 (diagnosis)	**EUROPE** *Greece*: Papadopoulos et al. 2003 (diagnosed); Voulgari et al. 2004 (earlier age of onset, diagnosed); *Ireland*: K Vandenbroeck et al. 2003; *Sweden*: Ostensen et al. 1983 **LATIN AMERICA** *Brazil*: Barreto et al. 2004:113 (elderly) **NORTH AMERICA** *United States*: Sherrer et al. 1986 (diagnosed); Deighton et al. 1992 (diagnosed); Liang & Karlson 1996; Gabriel et al. 2003 (diagnosed)	**NORTH AMERICA** *United States*: CL Short et al. 1957 (diagnosis); Masi et al. 1984 (diagnosis); Lahita 1985 (diagnosed)

3.2.9.10. Ankylosing Spondylitis

Ankylosing spondylitis, a form of rheumatoid arthritis, is an inflammatory disease that affects the joints between the spinal vertebrae and also in the joints between the spine and the pelvis. The causes of this disease are unknown although genetic factors are suspected. Table 3.2.9.10 indicates that it is more common in males than in females.

Table 3.2.9.10. Ankylosing spondylitis.

Nature of Any Difference						Postpubertal	Multiple Age Categories
						Adult	
Males more						**EUROPE** *Britain*: Calin 1985 (diagnosis); K MacKay et al. 1997 (diagnosis)	**NORTH AMERICA** *United States*: Lipsky 1991
No signif. difference							
Females more							

3.2.9.11. Diffuse Idiopathic Skeletal Hyperostosis (DISH)

Diffuse idiopathic skeletal hyperostosis (DISH) – also known as Forestier's disease – is a type of arthritis characterized by excessive bone growth in parts of the spinal vertebrae, or elbow, knee, or heel. This disease has been found to be more prevalent among males than among females (Table 3.2.9.11).

Table 3.2.9.11. Diffuse idiopathic skeletal hyperostosis (DISH).

Nature of Any Difference						Postpubertal
						Adult
Males more						**EUROPE** *Finland*: Julkunen et al. 1981; *Lithuania*: Jankauskas 2003 (Medieval period, skeletons) **NORTH AMERICA** *United States*: J Rogers et al. 1997
No signif. difference						
Females more						

3.2.9.12. Temporomandibular Disorder (TMD)

Temporomandibular disorder (TMD) is a disease of the jaw resulting from a variety of factors, including physical trauma and continual clinching and grinding of the teeth and jaw. Females are more frequently diagnosed with TMD than are males, according to the available evidence (Table 3.2.9.12).

Table 3.2.9.12. Temperomandibular disorder.

Nature of Any Difference						Multiple Age Categories
More males						
No signif. difference						
More females						**EUROPE** *Sweden*: Salonen et al. 1990 **NORTH AMERICA** *Canada*: Dao & LeResche 2000; *United States*: Maixner et al. 1995 (diagnosis)

3.2.10. Infectious Diseases

Infectious diseases are ones that can be transmitted from one living organism to another, nearly always as a result of a viral or bacterial agent. Sex differences in the prevalence of these diseases are summarized below.

3.2.10.1. Infectious Diseases in General

A couple of studies have found males to be more likely to contract infectious diseases in general than females (Table 3.2.10.1).

Table 3.2.10.1. Infectious diseases in general.

Nature of Any Difference	Prepubertal		Postpubertal	Multiple Age Categories
	Neonate	Childhood	Adolescent	
Males more	**NORTH AMERICA** *United States*: Synnes et al. 1994 (diagnosed, among low birth weight babies)	**INTERNATIONAL** *Multiple Countries*: MS Green 1992 (diagnosed)		
No signif. difference				**EUROPE** *Britain*: D Field et al. 1997:2 (death)
Females more			**EUROPE** *Germany*: Kirkcaldy et al. 2003:54 (common cold, self-report)	

3.2.10.2. Chickenpox

The limited research on sex differences in contracting chickenpox indicates that for most age groupings, males and females are equally likely to be infected. The only possible exception is among adolescents and young adults among whom females seem to be more vulnerable (Table 3.2.10.2).

Table 3.2.10.2. Chickenpox.

Nature of Any Difference	Prepubertal			Postpubertal	
	Toddler	Early Childhood	Childhood	Adolescent	Adult
Males more					
No signif. difference	**EUROPE** *Britain*: DM Fleming et al. 2003*	**EUROPE** *Britain*: DM Fleming et al. 2003*	**EUROPE** *Britain*: DM Fleming et al. 2003*		**EUROPE** *Britain*: DM Fleming et al. 2003* (middle age & elderly)
Females more				**EUROPE** *Britain*: DM Fleming et al. 2003*	**EUROPE** *Britain*: DM Fleming et al. 2003* (young)

3.2.10.3. Hepatitis

Hepatitis is an inflammation of the liver that can be caused by viral or bacterial infections, but may also be induced from continuous exposure to alcohol and certain drugs. Table 3.2.10.3 indicates that females are more likely to contract hepatitis than males.

Table 3.2.10.3. Hepatitis.

Nature of Any Difference	Postpubertal
	Adult
More in males	**NORTH AMERICA** *United States*: Alter et al. 1999 (hepatitis C); Rosenberg et al. 2001 (hepatitis C, mentally ill persons); Butterfield et al. 2003 (hepatitis C, mentally ill persons)
No signif. difference	
More in females	**EUROPE** *Hungary*: I Tornai et al. 2005 (chronic hepatitis C) **NORTH AMERICA** *United States*: JJ Keating et al. 1987

3.2.10.4. Herpes Simplex

Herpes simplex is a viral infection that primarily affects the genital area and the mouth. Two studies have concluded that the condition is more common in females than in males (Table 3.2.10.4).

Table 3.2.10.4. Herpes simplex.

Nature of Any Dif-ference						Multiple Age Categories
Males more						
No signif. difference						
Females more						**EUROPE** *Britain*: DM Fleming et al. 2003 (all age groups); *Scotland*: JD Ross et al. 1993

3.2.10.5. Influenza

Influenza is a contagious viral infection that can be airborne or transmitted through direct or indirect contact. There are a large number of influenza viruses that affect humans. The virus targets the respiratory tract and can produce life-threatening complications in persons with weakened immune systems such as the elderly, persons with diabetes, and those infected with the HIV disease. Most studies have found males contracting influenza more often than females (Table 3.2.10.5).

Table 3.2.10.5. Influenza.

Nature of Any Dif-ference	Prepubertal				Postpubertal		Multiple Age Categories
	Infant			Childhood		Adult	
More in males	**INTERNATIONAL** *Several Industrial Countries*: Mage & Donner 2004:1211 (death)			**NORTH AMERICA** *United States*: SD Collins & Gover 1933; Dingle et al. 1964; Monto & Ullman 1974; Van Volkensburg & Frost 1933		**EUROPE** *Britain*: Office of Population Censuses & Surveys 1973	**NORTH AMERICA** *United States*: Waldron 1982:73 (death); Noymer & Garenne 2000 (death)
No signif. difference							
More in females				**NORTH AMERICA** *United States*: McCammon 1971 (mild)			

3.2.10.6. Post-Streptococcal Nephritis

Post-streptococcal nephritis is an infectious inflammation of the kidney tubules that help to filter waste from the blood. It most commonly afflicts young school age children. As shown in Table 3.2.10.8, it appears to be more common in males than in females.

Table 3.2.10.6. Post-streptococcal nephritis.

Nature of Any Dif-ference						Multiple Age Categories
Males more						**NORTH AMERICA** *United States*: Seegal & Earle 1941; HC Dillon 1970
No signif. difference						
Females more						

3.2.10.7. Rheumatic Fever

When a person becomes infected with the streptococcus bacteria (major symptoms including strep throat or scarlet fever) it can lead to rheumatic fever if not properly treated. Rheumatic fever is an autoimmune disease affecting the heart, joints, and the brain. Limited research has failed to find any significant sex difference in contracting rheumatic fever (Table 3.2.10.7).

Table 3.2.10.7. Rheumatic fever.

Nature of Any Dif-ference					Postpubertal		Multiple Age Categories
						Adult	
More in males							
No signif. difference						**NORTH AMERICA** *United States*: Stollerman 1975	**NORTH AMERICA** *United States*: Seegal & Earle 1941
More in females							

3.2.10.8. Shingles

Persons who had chicken pox in childhood will sometimes break out later in life with shingles, a condition of the skin that usually clears up within a few weeks or months. As shown in Table 3.2.10.8, most studies have found shingles to occur more frequently among females.

Table 3.2.10.8. Shingles.

Nature of Any Difference	Prepubertal			Postpubertal		Multiple Age Categories
	Toddler	Early Childhood	Childhood	Adolescent	Adult	
Males more						
No signif. difference				**EUROPE** *Britain*: DM Fleming et al. 2003* (diagnosed)	**EUROPE** *Britain*: DM Fleming et al. 2003* (young, diagnosed)	**EUROPE** *France*: Chidiac et al. 2001 (diagnosed); *Italy*: Ragozzino et al. 1982 (diagnosed); Di Luzio Paparatti et al. 1999 (diagnosed)
Females more	**EUROPE** *Britain*: DM Fleming et al. 2003* (diagnosed)	**EUROPE** *Britain*: DM Fleming et al. 2003* (diagnosed)	**EUROPE** *Britain*: DM Fleming et al. 2003* (diagnosed)		**EUROPE** *Britain*: DM Fleming et al. 2003* (middle age & elderly, diagnosed)	**EUROPE** *Britain*: Glynn et al. 1990 (diagnosed); *Scotland*: Torrens et al. 1998 (diagnosed)

3.2.10.9. Strongyloides Infection

Strongyloidiasis is an intestinal bacterial infection most common in tropical and subtropical regions. Studies both in humans and in mice indicate that males are more likely afflicted with and less likely cured from this disease than are females (Table 3.2.10.9).

Table 3.2.10.9. Strongyloides infection.

Nature of Any Difference	Postpubertal
	Adult
More in males	**ASIA** *Japan*: Satoh et al. 2004 **RODENT** *Mouse*: Kiyota 1984
No signif. difference	
More in females	

3.2.11. Respiratory Diseases

Respiratory diseases are those that adversely affect breathing. Research findings surrounding sex differences in these diseases are presented below.

3.2.11.1. Respiratory Diseases in General

Research pertaining to a variety of unspecified respiratory diseases has failed to agree upon any significant sex difference in these ailments (Table 3.2.11.1).

Table 3.2.11.1. Respiratory diseases in general.

Nature of Any Difference	Multiple Age Categories
More in males	**EUROPE** *Norway*: Mackenbach et al. 1999:1803* (death) **NORTH AMERICA** *United States*: Dorn 1961 (death); Waldron 1982:73 (diagnosed); Mackenbach et al. 1999:1803* (death)
No signif. difference	**EUROPE** *Britain*: D Field et al. 1997:2 (death)
More in females	**NORTH AMERICA** *United States*: CS Wilder 1964a (diagnosed); CS Wilder 1964b (diagnosed)

3.2.11.2. Asthma

Asthma is a disease that affects the bronchial tubes when allergens or environmental triggers such as dust mites, pollen, animal dander, and molds cause the tightening of muscle bands around the airways, constricting them and preventing the flow of air. Studies of gender differences in the prevalence of asthma have not been consistent, except in the case of young children when males are considerably more often diagnosed as asthmatic than females (Table 3.2.11.2). It may be that with age, females become relatively more susceptible to asthma than males.

Table 3.2.11.2. Asthma.

Nature of Any Difference	Prepubertal				Postpubertal		Multiple Age Categories
		Toddler	Early Childhood	Childhood	Adolescent	Adult	
More in males		**INTERNATIONAL** *Multiple countries*: deMarco et al. 2000* (diagnosed)	**NORTH AMERICA** *United States*: Clough 1993 (diagnosed); S Redline 1994 (diagnosed) **INTERNATIONAL** *Multiple countries*: deMarco et al. 2000* (diagnosed)	**EUROPE** *Belgium*: Wierenga et al. 1999 (diagnosed); *Britain*: Luyt et al. 1993 (diagnosed) **NORTH AMERICA** *United States*: R Dodge & Burrows 1980 (diagnosed); PA Silva 1990*; HR Anderson et al. 1992* **OCEANIA** *New Zealand*: MR Sears et al. 2003* **INTERNATIONAL** *Multiple Countries*: deMarco et al. 2000* (diagnosed)		**NORTH AMERICA** *United States*: D Goodman et al. 1994 (diagnosed)	**NORTH AMERICA** *United States*: Schwab et al. 1974 (diagnosed); Waldron 1982:73 (death)
No signif. difference				**NORTH AMERICA** *United States*: Achenbach & Edelbrock 1981:14* (diagnosed)	**EUROPE** *Britain*: Venn et al. 1988 (diagnosed) **NORTH AMERICA** *United States*: Achenbach & Edelbrock 1981:14* (diagnosed); PA Silva 1990*; HR Anderson et al. 1992*; S Anderson & Daviskas 1992 (diagnosed) **OCEANIA** *New Zealand*: MR Sears et al. 2003* **INTERNATIONAL** *Multiple Countries*: deMarco et al. 2000* (diagnosed)	**LATIN AMERICA** *Brazil*: Barreto et al. 2004:113 (over 60; asthma & bronchitis combined)	**NORTH AMERICA** *Canada*: Walters et al. 2002:687; *United States*: Polednak 1989:246
More in females				**NORTH AMERICA** *United States*: Clough 1993 (diagnosed); S Redline 1994 (diagnosed); Cleary et al. 2004:43* (asthma & emphysema problems)		**NORTH AMERICA** *Canada*: Chen et al. 2000 (diagnosis); Chen 2004:448 (hospitalization); *United States*: PA Silva 1990*; HR Anderson 1992*; Skobeloff et al. 1992 (diagnosed) **INTERNATIONAL** *Multiple Countries*: Leidy & Coughlin 1998 (disease symptoms); DeMarco et al. 2000* (diagnosed); Mathias et al. 2000 (disease symptoms); Gelin et al. 2004 (disease symptoms)	**NORTH AMERICA** *Canada*: Chen et al. 2001 (diagnosis); *United States*: Osborne et al. 1998 (disease symptoms)

3.2.11.3. Asthma's Relationship to Obesity

Several studies have investigated the link between asthma and obesity and found the two conditions to be postively correlated. In addition, most of these studies have revealed a stronger asthma-obesity correlation among females than among males (Table 3.2.11.3).

Table 3.2.11.3. Asthma's relationship to obseity.

Nature of Any Difference						Multiple Age Categories
			Childhood	Adolescent	Adults	
More in males			**NORTH AMERICA** *United States*: Gilliland et al. 2003			
No signif. difference						
More in females			**EUROPE** *Britain*: Figueroa-Munoz et al. 2001 **NORTH AMERICA** *United States*: Castro-Rodriguez et al. 2001; Schachter et al. 2003	**ASIA** *Taiwan*: Huang et al. 1999	**NORTH AMERICA** *Canada*: Y Chen et al. 1999; Y Chen et al. 2002; *United States*: Shaheen et al. 1999 (college); Beckett et al. 2001; Romieu et al. 2003	**NORTH AMERICA** *United States*: Del-Rio-Navarro et al. 2003 (Hispanics) **OCEANIA** *New Zealand*: Hancox et al. 2005

3.2.11.4. Chronic Obstructive Pulmonary Disease (COPD)

Chronic obstructive pulmonary disease subsumes two lung diseases – bronchitis and emphysema – both of which are characterized by obstruction of airflow to the lungs. Table 3.2.11.4 suggests death due to COPD is more common among males, but that among smokers women are more often diagnosed with the ailment than are men.

Table 3.2.11.4. Chronic obstructive pulmonary disease (COPD).

Nature of Any Difference					Postpubertal		
					Adult	Multiple Age Categories	
More in males						**NORTH AMERICA** *United States*: US Center for Disease Control 1993 (death); National Center for Health Statistics 1994 (death)	
No signif. difference							
More in females					**NORTH AMERICA** *United States*: R Carter et al. 1994 (smokers, diagnosis); E Prescott et al. 1997 (smokers, diagnosis)		

3.2.11.5. Dyspnea

Dyspnea involves chronic discomfort breathing and is often an accompaniment of COPD. According to the one available study, dyspnea is more common among females than among males (Table 3.2.11.5).

Table 3.2.11.5. Dyspnea.

Nature of Any Difference						Postpubertal	
						Adult	
Males more							
No signif. difference							
Females more						**NORTH AMERICA** *United States*: Cleary et al. 2004:49 (diagnosis)	

3.2.11.6. Embolism

Embolisms are blood clots in the lungs, which prevent oxygen from getting to the body. As shown in Table 3.2.11.6, one study concluded that once diagnosed, males are less likely than females to survive for a given period of time.

Table 3.2.11.6. Embolism.

Nature of Any Difference						Postpubertal	
						Adult	
Males more						**NORTH AMERICA** *United States*: Siddique et al. 1998 (elderly, shorter survival)	
No signif. difference							
Females more							

3.2.11.7. Emphysema

Emphysema is a chronic obstructive pulmonary disease that is caused by the inflammation of the alveoli (small air-sacs) in the lungs**.** When these air sacs become inflamed a person cannot properly inhale and exhale, thereby causing shortness of breath. Studies are not consistent with respect to gender differences in the prevalence of emphysema (Table 3.2.11.7).

Table 3.2.11.7. Emphysema.

Nature of Any Difference	Postpubertal	Multiple Age Categories
	Adult	
More in males		**NORTH AMERICA** *United States*: Waldron 1982:73 (death); Waldron 1986:41 (diagnosed)
No signif. difference		
More in females	**NORTH AMERICA** *United States*: EK Silverman et al. 2000 (diagnosed among smokers); Cleary et al. 2004:43 (“emphysema problems”)	**NORTH AMERICA** *Canada*: V Walters et al. 2002:687 (diagnosed)

3.2.11.8 Pneumonia (and Similar Lung Infections)

Pneumonia is an inflammation due to fluid in the air sacs of the lungs. Over 30 causes of pneumonia have been identified, including viral and bacterial infections. Nearly all studies have concluded that pneumonia afflicts males more than females, not only in humans but in mice as well (Table 3.2.11.8).

Table 3.2.11.8. Pneumonia (and similar lung infections).

Nature of Any Difference	Prepubertal			Postpubertal		Multiple Age Categories
	Toddler	Early Childhood	Childhood	Adolescent	Adult	
More in males	**NORTH AMERICA** *United States*: National Center for Health Statistics 1994* (death)	**NORTH AMERICA** *United States*: National Center for Health Statistics 1994* (death, preschool)	**NORTH AMERICA** *United States*: National Center for Health Statistics 1994* (death)	**NORTH AMERICA** *United States*: JD Cherry et al. 1975 (diagnosed); Foy et al. 1979 (diagnosed); Foy 1993 (diagnosed); National Center for Health Statistics 1994* (death) **RODENT** *Mouse*: Yancey et al. 2001 (diagnosed)	**NORTH AMERICA** *United States*: National Center for Health Statistics 1994* (death, young, & middle age); Callahan & Wolinsky 1996 (elderly, diagnosed); M Loeb et al. 1999 (elderly, diagnosed) **RODENT** *Mouse*: SA Huber et al. 1982 (young, diagnosed); Mock & Nacy 1988 (ytyoung, diagnosed); Y Yamamoto et al. 1990 (young, diagnosed); Ashman et al. 1991 (young, diagnosed); Y Yamamoto et al. 1991 (young, diagnosed)	**NORTH AMERICA** *United States*: Waldron 1982:73 (death); Offner et al. 1999 (diagnosed); HS Gordon & Rosenthal 1999 (diagnosed) **OCEANIA** *Formosa*: CW Chen et al. 1992 (diagnosed)
No signif. difference						
More in females					**NORTH AMERICA** *United States*: National Center for Health Statistics 1994* (death, elderly)	

3.2.11.9a. Tuberculosis for Subadults

Tuberculosis (TB) is an infectious disease caused by a specific type of bacteria. This disease primarily affects tissue of the lungs, but is also able to attack the kidneys, bones, lymph nodes, and other organs. Those most affected by the disease are persons with weakened immune systems. Left untreated, TB is fatal to about half of all individuals who become infected. Split-Table 3.2.11.9a shows that prior to adulthood, studies have reached inconsistent conclusions with respect to any gender differences in TB, although most studies of adolescents suggest no significant sex difference.

Split-Table 3.2.11.9a. Tuberculosis for subadults.

Nature of Any Difference	Prepubertal	Postpubertal
	Childhood	Adolescent
Higher in males	**AFRICA** *Tanzania*: Ipuge & Styblo 1995* **NORTH AMERICA** *United States*: Center for Disease Control 1992* (death)	
No signif. difference		**AFRICA** *Kenya*: Kibuga 1992*; *Multiple African Countries*: Roelsgaard et al. 1964* **ASIA** *Korea*: Ministry of Health 1990* **EUROPE** *Denmark*: Groth-Petersen et al. 1959*; *Netherlands*: Sutherland et al. 1983*; *Norway*: Norwegian National Health Screening Service 1937* **LATIN AMERICA** *Nicaragua*: Cruz Gonzalez 1993* **MIDDLE EAST** *India*: Gothi et al. 1974*; Baily et al. 1980* **NORTH AMERICA** *United States*: Comstock et al. 1967* (Alaska)
Higher in females	**MIDDLE EAST** *India*: Rao 1982* (death)	**MIDDLE EAST** *India*: Rao 1982* (death) **NORTH AMERICA** *Canada*: Grzybowski & Allen 1964*; *United States*: LK Frank 1933* (diagnosed); Center for Disease Control 1992* (death)

3.2.11.9b. Tuberculosis for Adults and Multiple Age Groups

Most of the research on sex differences in tuberculosis for adults and multiple age groups has concluded that males are more likely to contract the disease and die from it than are women (Split-Table 3.2.11.9b).

Split-Table 3.2.11.9b. Tuberculosis for adults and multiple age groups.

Nature of Any Difference	Postpubertal	Multiple Age Categories
	Adult	
Higher in males	**AFRICA** *Kenya*: Kibuga 1992*; *Multiple African Countries*: Roelsgaard et al. 1964* **ASIA** *China*: Ministry of Public Health 1985* (death); *Korea*: Ministry of Health 1990* **EUROPE** *Denmark*: Groth-Petersen et al. 1959*; *Netherlands*: Sutherland et al. 1983; *Norway*: Norwegian National Health Screening Service 1937* **LATIN AMERICA** *Nicaragua*: Cruz Gonzalez 1993* **MIDDLE EAST** *India*: Gothi et al. 1974; Baily et al. 1980* **NORTH AMERICA** *Canada*: Grzybowski & Allen 1964*; *United States*: Comstock & Edwards 1975 (African-Americans); Center for Disease Control 1992* (death among elderly); Noymer & Garenne 2000:571 (death)	**AFRICA** *Tanzania*: Ipuge & Styblo 1995* **EUROPE** *Britain*: Styblo 1973
No signif. difference	**NORTH AMERICA** *United States:* Cleary et al. 2004:43*	
Higher in females	**NORTH AMERICA** *United States*: Comstock et al. 1967* (Alaska)	**NORTH AMERICA** *United States*: LK Frank 1933* (ages 12-27, death)

3.2.11.10. Wegener's Granulomatosis

Wegener's granulomatosis is a rare disease that affects many different organs of the body, but nearly always causes the blood vessels to become inflamed and constricted, thereby reducing blood flow to affected organs. The two available studies on sex differences in this disease both concluded that it affects males and females equally (Table 3.2.11.10).

Table 3.2.11.10. Wegener's granulomatosis.

Nature of Any Difference	Postpubertal
	Adult
Males more	
No signif. difference	**NORTH AMERICA** *United States*: Hunder & Conn 1989; GS Hoffman et al. 1992
Females more	

3.2.12. Diseases of the Sensory Organs

Below the findings of sex differences in the contraction of a few diseases (other than cancer) that affect various sensory organs are presented.

3.2.12.1. Eye Diseases in General

A limited amount of research has sought to determine if a sex difference exists in various aliments in and around the eye. As shown in Table 3.2.12.1, the research findings have been conflicting regarding any sex difference in eye diseases in general.

Table 3.2.12.1. Eye diseases in general.

Nature of Any Dif-ference	Prepubertal				Postpubertal		Multiple Age Categories
				Childhood	Adolescent	Adult	
More males						**NORTH AMERICA** *United States*: Ganley 1983:13* (age 60 & up more problems needing medical treatment)	
No signif. difference				**NORTH AMERICA** *United States*: Hannaford 1966:12* (consultation)		**NORTH AMERICA** *United States*: Ganley 1983:13* (age 0 to 60 years no difference in eye pathology)	**NORTH AMERICA** *United States*: RW Wilson 1968:6 (consultation)
More females					**NORTH AMERICA** *United States*: Hannaford 1966:12* (consultation)	**MIDDLE EAST** *India*: Nirmalan et al. 2003 (cataracts, diagnosed) **NORTH AMERICA** *United States*: Hannaford 1966:12* (consultation)	

3.2.12.2. Hearing Impairment/Deafness

One study of hearing impairment found it to be more prevalent among males than among females (Table 3.2.12.2).

Table 3.2.12.2. Hearing impairment/deafness.

Nature of Any Dif-ference							Multiple Age Categories
More in males							**NORTH AMERICA** *United States*: H Best 1943 (diagnosed)
No signif. difference							
More in females							

3.2.13. Skin Diseases

Diseases of the skin include mildly irritating skin discolorations and rashes as well as extremely painful dermal conditions. Covered elsewhere are cancerous skin diseases (i.e., under *cancer*).

3.2.13.1. Skin Diseases in General

With the possible exception of the very young, skin diseases in general appear to be more common among females than males (Table 3.2.13.1).

Table 3.2.13.1. Skin diseases in general.

Nature of Any Dif-ference	Prepubertal				Postpubertal		
	Neonate			Childhood	Adolescent	Adult	
More males							
No signif. difference	**NORTH AMERICA** *United States*: Hannaford 1966:27* (consultation)					**NORTH AMERICA** *United States*: Cleary et al. 2004:43* (skin problems)	
More females				**NORTH AMERICA** *United States*: Hannaford 1966:27* (consultation)	**NORTH AMERICA** *United States*: Hannaford 1966:27* (consultation); JC Huff 1991 (erythema multiforme)*	**NORTH AMERICA** *United States*: Hannaford 1966:27* (consultation, young, full, & elderly); JC Huff 1991* (erythema multiforme)	

3.2.13.2. Scleroderma

Scleroderma is a skin disease characterized by the formation of scar tissue in the skin and sometimes in other organs of the body (it is also classified as an autoimmune disease). Females appear to suffer more from scleroderma than do males (Table 3.2.13.2).

Table 3.2.13.2. Scleroderma.

Nature of Any Difference	Postpubertal
	Adult
More in males	
No signif. difference	
More in females	**NORTH AMERICA** *United States*: Gilliland 1991

3.2.14. Stress-Related (Stress-Induced) Illnesses/Conditions

Stress refers to a continual wear and tear on the body, either physically or emotionally. In some cases, stress can result in illnesses or other adverse conditions. Below one finds summarized research linking stress to these illnesses and conditions.

3.2.14.1. Ill Health Due to Prenatal Stress

Two studies have concluded that males are more likely than females to exhibit various forms of ill health due to the mother experiencing stress during pregnancy (Table 3.2.14.1).

Table 3.2.14.1. Ill health due to prenatal stress.

Nature of Any Difference	Prepubertal
	Neonate
More in males	**NORTH AMERICA** *United States*: Stinson 1985 (adverse neuro-behavioral effects); RM Murray 1991 (adverse neuro-behavioral effects)
No signif. difference	
More in females	

3.2.14.2. Birth Weight Depression Due to Food Deprivation to the Mother

The available studies on the effects of food deprivation to mothers during pregnancy indicate that the birth weights of males are more depressed than are those of females (Table 3.2.14.2).

Table 3.2.14.2. Birth weight depression due to food deprivation to the mother.

Nature of Any Difference	Prepubertal
	Neonate
More in males	**ASIA** *Soviet Union*: Antonov 1947 **EUROPE** *Netherlands*: Susser 1981 **LATIN AMERICA** *Peru*: Frisancho et al. 1977
No signif. difference	
More in females	

3.2.15. Other Types of Diseases

Diseases that could not be easily classified into any of the categories identified above are discussed below.

3.2.15.1. Diabetes Mellitus

Diabetes is a disease in which the body fails to produce and/or improperly utilize insulin, the hormone that converts sugar and starch to usable energy. The causes of diabetes include genetics, environment, and physical conditions such as obesity. Diabetes can create problems in the kidneys, eyes, heart, and feet of affected individuals. This disease is more common in African Americans, Latinos, Native Americans, and Pacific Islanders than among Caucasian and most Asian populations.

Two types of diabetes are recognized: Type 1 and Type 2. The main difference is that Type 1 diabetics are insulin dependent, whereas Type 2 diabetics may or may not need insulin injections to control their blood glucose levels. Also, Type 1 diabetes is usually diagnosed during childhood, while Type 2 is usually diagnosed during later adulthood. Table 3.2.15.1 provides inconsistent evidence with respect to gender differences in diabetes, although most studies have found males being more often affected than females.

Table 3.2.15.1. Diabetes mellitus.

Nature of Any Difference	Prepubertal				Postpubertal		Multiple Age Categories
				Childhood	Adolescent	Adult	
More in males				**EUROPE** *Finland*: Tuomilehto et al. 1992 (Type I)	**EUROPE** *Belgium*: Weets et al. 2001* (diagnosed, Type II); *France*: Barendregt et al. 2000* (diagnosed Type II, and contracted at an earlier age)	**ASIA** *Japan*: Sairenchi et al. 2004 (Type 2) **EUROPE** *Belgium*: Weets et al. 2001* (Type I); *Germany*: Meisinger et al. 2005 (Type 2); *The Netherlands*: Barendregt et al. 2000* (elderly, non-insulin dependent) **NORTH AMERICA** *United States*: Gale & Gillespie 2001 (Type I)	**ASIA** *Taiwan*: Hsu et al. 2002:58 (diagnosed) **EUROPE** *Belgium*: Gorus 1997 (diagnosis, Type 1); Weets et al. 2001* (diagnosis, Type 1); *Sweden*: Blohme et al. 1992 (Type I) **NORTH AMERICA** *United States*: Waldron 1982:73 (mellitus, death); Gale & Gillespie 2001 (diagnosis, Type 1); Meisinger et al. 2002 (diagnosed)
No signif. difference						**EUROPE** *The Netherlands*: Barendregt et al. 2000* (middle aged adults, non-insulin dependent)	**NORTH AMERICA** *United States*: Paeratakul et al. 2002:1206 (mellitus, diagnosed); Cleary et al. 2004:43* (diabetes)
More in females					**EUROPE** *Hungary*: Gyorffy et al. 2002 (genetic susceptibility to Type I)	**EUROPE** *Hungary*: E. Nieszer 2005 (heart-coronary disorder patients) **LATIN AMERICA** *Brazil*: Barreto et al. 2004:113 (elderly)	**EUROPE** *United States*: US Center for Disease Control 1993 (death); National Center for Health Statistics 1994 (death)

3.2.15.2. Diseases of the Gall Bladder

Although the research is limited, gall bladder diseases appear to be more common among females than among males (Table 3.2.15.2).

Table 3.2.15.2. Diseases of the gall bladder.

Nature of Any Difference							Multiple Age Categories
Males more							
No signif. difference							
Females more							**NORTH AMERICA** *United States*: A Damon 1964; JP Bunker et al. 1995:328 (diagnosed gall stones); Cleary et al. 2004:43 (gall bladder problems)

3.2.15.3. Facial/Oral Diseases

Research undertaken to determine if sex differences exist in the incidence of facial and oral diseases has concluded that either no significant differences exist or that females suffer from such conditions more than do males (Table 3.2.15.3).

Table 3.2.15.3. Facial/oral diseases.

Nature of Any Difference							Multiple Age Categories
Males more							
No signif. difference							**NORTH AMERICA** *Canada*: Locker & Grushka 1987 (consultation); *United States*: H Taylor & Curran 1985 (consultation); Von Korff et al. 1991 (consultation)
Females more							**EUROPE** *Sweden*: Agerberg & Carlsson 1972 (consultation) **NORTH AMERICA** *United States*: Helkimo 1976 (consultation)

3.2.15.4. Renal Diseases in General

Renal (or kidney) diseases have been studied with respect to possible gender differences, with most studies concluding that males have these diseases more than females (Table 3.2.15.4).

Table 3.2.15.4. Renal diseases in general.

Nature of Any Difference						Multiple Age Categories
Males more						**EUROPE** *France*: P Simon et al. 1994 **NORTH AMERICA** *United States*: Hannedouch et al. 1993; Silbiger & Neugarten 1995; Coggins et al. 1998
No signif. difference						
Females more						**EUROPE** *Hungary*: Szabo & Muller 2002 (renal allograft rejection)

3.3
MINOR AILMENTS and SYMPTOMS of ILL-HEALTH

Below are presented a review of findings pertaining to gender differences in the prevalence of various relatively minor diseases, meaning ones that are rarely life-threatening.

3.3.1. Headaches

The term *headache* refers to a wide variety of pain felt in the head. While the brain itself does not feel pain, it is able to register pain from nerves surrounding it.

3.3.1.1. Headaches in General

All studies of headaches of the variety that nearly everyone endures from time to time have concluded that they are more often experienced by females than by males (Table 3.3.1.1).

Table 3.3.1.1. Headaches in general.

Nature of Any Difference				Postpubertal		Multiple Age Categories
				Adolescent	Adult	
Males more						
No signif. difference						
Females more				**NORTH AMERICA** *United States*: Egger et al. 1999	**EUROPE** *Denmark*: BK Rasmussen et al. 1991; BK Rasmussen 1995; *Finland*: Nikiforow 1981 (clinical sample); *Germany*: H Gobel et al. 1994 **NORTH AMERICA** *United States*: Andrasik et al. 1979 (young, diagnosed); Linet et al. 1989 (young, diagnosed); Celentano et al. 1990 (young, diagnosed)	**AFRICA** *Zimbabwe*: Levy 1983 (diagnosed) **EUROPE** *Britain*: JE Green 1977 (diagnosed); Newland et al. 1978 (diagnosed); Furnham & Kirkcaldy 1997; *Denmark*: Rasmussen et al. 1992 (diagnosed); *Germany*: T Koehler et al. 1992 (diagnosed); *Netherlands*: Post & Gubbels 1986 (diagnosed) **NORTH AMERICA** *United States*: Von Korff et al. 1991 (diagnosed); Stewart & Lipton 1993 (diagnosed)

3.3.1.2. Headaches (Excluding Migraines and Cluster Headaches)

If migraine and cluster headaches are set aside, gender differences in the prevalence of headaches becomes less consistent. Nevertheless, most studies have still concluded that females suffer from headaches other than migraines and cluster headaches than do males (Table 3.3.1.2).

Table 3.3.1.2. Headaches (excluding migraines and cluster headaches).

Nature of Any Difference	Prepubertal				Postpubertal		Multiple Age Categories
				Childhood	Adolescent	Adult	
Males have them more often						**OCEANA** *Malaysia*: EE Alders et al. 1996* (non-tension headaches)	**LATIN AMERICA** *Republic of San Marino*: D'Alessandra et al. 1986 (diagnosed) **NORTH AMERICA** *United States*: Kunkle et al. 1952 (diagnosed)
No signif. difference				**EUROPE** *Britain*: Mortimer et al. 1992 (diagnosed); *Iceland*: Kristjansdottir & Wahlberg 1993* (diagnosed)		**NORTH AMERICA** *United States*: N Lester et al. 1994 (young, diagnosed)	**AFRICA** *Nigeria*: Osuntokun 1992 (diagnosed) **EUROPE** *France*: Henry et al. 1992* (diagnosed) **MIDDLE EAST** *Israel*: JH Abramson et al. 1980 (diagnosed)
Females have them more often					**EUROPE** *Britain*: JP Sparks 1978 (diagnosed); *Denmark*: Oster 1972b (diagnosed); *Finland*: Sillanpaa 1983a (diagnosed); Aro et al. 1987 (diagnosed); Aro et al. 1989b (diagnosed); *Iceland*: Kristjansdottir & Wahlberg 1993* (diagnosed); *Netherlands*: Passchier & Orlebeke 1985 (diagnosed); *Sweden*: Larsson 1991 (diagnosed) **NORTH AMERICA** *United States*: Deubner 1977 (diagnosed); Beiter et al. 1991 (diagnosed); Ingersoll et al. 1993:71 (diagnosed); Newacheck & Taylor 1992 (diagnosed)	**ASIA** *China*: Cheng et al. 1986 (severe); *Hong Kong*: Wong et al. 1995; *Taiwan*: Wang et al. 1997 (elderly, severe & overall headaches); *Thailand*: Srikiatkhachorn 1991 (elderly) **EUROPE** *Denmark*: Dalsgaard-Nielsen & Ulrich 1973 (young, diagnosed); *Finland*: Honkasalo et al. 1993; Nikiforow & Hokkanen 1978; *France*: P Henry et al. 1992*; *Germany*: Gobel et al. 1994 **NORTH AMERICA** C*anada*: Edmeads et al. 1993 (tension headaches); *United States*: WE Waters & O'Connor 1975; Andrasik et al. 1979 (young, diagnosed); Attansio & Androsik 1987 (young, diagnosed); Hale et al. 1987 (elderly, diagnosed); NR Cook et al. 1989 (elderly0; Celentano et al. 1990 (young, diagnosed); Kroenke & Price 1993; BK Rasmussen 1993b (tension headaches) **OCEANA** *Malaysia*: EE Alders et al. 1996* (tension headaches)	**AFRICA** *Zimbabwe*: Levy 1983 (diagnosed) **EUROPE** *Britain*: WE Waters 1975 (diagnosed); WE Waters & O' Conner 1975 (diagnosed); C Philips 1977 (diagnosed); JE Green 1977 (diagnosed); Newland et al. 1978 (diagnosed); *Denmark*: BK Rasmussen et al. 1991 (diagnosed); *Finland*: Nikiforow et al. 1978 (diagnosed); Aromaa et al. 1993 (diagnosed); Honkasalo et al. 1993 (diagnosed); *France*: Crisp et al. 1977 (diagnosed); Munoz et al. 1993 (diagnosed); *Germany*: T Koehler et al. 1992 (diagnosed); *Netherlands*: D Post & Gubbels 1986 (diagnosed); *Norway*: Hasvold & Johnsen 1993 (diagnosed); *Sweden*: Agerberg & Carlsson 1972 (diagnosed); Rundcranz et al. 1991 (dentists, diagnosed) **LATIN AMERICA** *Ecuador*: Sachs et al. 1985 (diagnosed) **NORTH AMERICA** *Canada*: Mior & Diakow 1987 (diagnosed); Pryse-Phillips et al. 1992 (diagnosed); *United States*: BT Horton 1941 (cluster headaches, diagnosed); Schwab et al. 1974 (diagnosed); DK Ziegler et al. 1977 (diagnosed); H Taylor & Curran 1985 (diagnosed); Attansio & Andrasik 1987 (diagnosed); Pullinger et al. 1988 (diagnosed); Von Korff et al. 1988 (diagnosed); Linet et al. 1989 (diagnosed); Ritchey et al. 1991 (homeless persons, diagnosed) Lipton & Stewart 1993 (diagnosed) **OCEANIA** *New Zealand*: FR James et al. 1991 (diagnosed)

3.3.1.3. Migraine Headaches

Unlike the more common types of headaches, *migraine headaches* are vascular in nature, resulting from the enlargement of the temporal artery or other blood vessels in the head. As the blood vessels expand, nerve cells around the vessels are stretched release chemicals, which results in pain and inflammation. During a migraine, the sympathetic nervous system may be activated producing gastrointestinal symptoms in the form of nausea, vomiting, and diarrhea. This response can also decrease blood circulation and contribute to light and sound sensitivity or blurred vision. Migraines can be triggered by specific foods, exposure to chemicals, or other environmental conditions. There are a variety of treatments for migraine headaches and some of the most prescribed are acupuncture, relaxation therapy, and medications. Many physicians suggest that sleep is one of the most effective ways to alleviate symptoms.

Table 3.3.1.3 indicates that except for a few studies that have found no significant gender difference, females are more prone to suffer from migraine headaches than males in all of the age groups represented. The studies are largely based on self-reports unless otherwise specified.

Table 3.3.1.3. Migraine headaches.

Nature of Any Dif-ference	Sub-adolescent				Postpubertal		Multiple Age Categories
				Childhood	Adolescent	Adult	
Males more							
No signif. difference				**EUROPE** *Britain*: Mortimer et al. 1992 (diagnosed); Abu-Arefeh & Russell 1994; *Finland*: Sillanpaa 1983b* (diagnosed)	**EUROPE** *Denmark*: Dalsgaard-Nielson & Ulrich 1973 (diagnosed)	**EUROPE** *Britain*: TJ Steiner et al. 2003	**EUROPE** *Germany*: H Gobel et al. 1994 **NORTH AMERICA** *United States*: WF Stewart et al. 1991; WF Stewart et al. 1992; MB Russell et al. 1995
Females more					**EUROPE** *Finland*: Sillanpaa 1983b* (diagnosed); *Sweden*: Bille 1962 (diagnosed); Bille 1981 (diagnosed) **NORTH AMERICA** *United States*: Deubner 1977 (diagnosed)	**AFRICA** *Nigeria*: Osuntokun et al. 1992 (young, diagnosed) **ASIA** *China*: Zhao et al. 1988; Cheng et al. 1990 (urban centers); *Hong Kong*: Wong et al. 1995; *Japan*: Ministry of Welfare 1995; Sakai & Igarashi 1997 (with and without auras); *Taiwan*: Wang et al. 1997 (elderly) **EUROPE** *Denmark*: Dalsgaard-Nielson & Ulrich 1973 (young, diagnosed); Rasmussen & Olesen 1992 (general population); BK Rasmussen 1995; *Finland*: Honkasalo et al. 1993; *France*: P Henry et al. 1992; *Norway*: Rasmussen et al. 1991; *Wales*: WE Waters 1975 (physicians' self-diagnosed); *Finland*: Honkasalo et al. 1993 **LATIN AMERICA** *Ecuador*: Sachs et al. 1985 (rural village) **NORTH AMERICA** *Canada*: Edmeads et al 1993; *United States*: Breslau et al. 1991b (young, diagnosed); WF Stewart et al. 1992; BK Rasmussen 1993c; WF Stewart et al. 1994; WF Stewart et al. 1996; Unruh 1996; Cleary et al. 2004:43* (migraines) **OCEANIA** *Malaysia*: EE Alders et al. 1996	**EUROPE** *Britain*: C Philips 1977(diagnosed); JE Green 1977 (diagnosed); *France*: Henry et al. 1992 (diagnosed); Munoz et al. 1993 (diagnosed); P Henry 2000a (diagnosed); *Switzerland*: Merikangas et al. 1990 (diagnosed) **MIDDLE EAST** *Israel*: JH Abramson et al. 1980 (diagnosed) **NORTH AMERICA** *Canada*: Pryse-Phillips et al. 1992 (diagnosed); Walters et al. 2002:678; *United States*: BT Horton 1941 (diagnosed); JW Lance & Anthony 1971 (diagnosed); WF Stewart et al. 1991 (diagnosed); WF Stewart et al. 1992 (diagnosed); RB Lipton & Stewart 1993 (diagnosed); BC Martin et al. 1994 (diagnosed) **LATIN AMERICA** *Ecuador*: Sachs et al. 1985 (diagnosed) **OCEANIA** *New Zealand*: AN Thomson et al. 1993 (diagnosed)

3.3.1.4. Cluster Headaches

So-called cluster headaches involve recurrent pain in one eye or temple on just one side of the head. As shown in Table 3.3.1.4, this appears to be the type of headache that occurs more commonly among males than among females.

Table 3.3.1.4. Cluster headaches.

Nature of Any Dif-ference							Multiple Age Categories
Males more							**EUROPE** *Italy*: Manzoni 1997 (diagnosed); *Sweden*: Ekbom 1947 (diagnosed); Sjostrand et al. 2000 (diagnosed); Ekbom et al.2002:97 (diagnosed) **NORTH AMERICA** *United States*: BT Horton 1941 (diagnosed); BT Horton 1956 (diagnosed); JW Lance & Anthony 1971 (diagnosed)
No signif. difference							
Females more							

3.3.1.5. Seeking/Obtaining Medical Treatment for Headaches and Migraines

All available research has concluded that females are more likely than males to seek medical treatment for headaches (often including migraines; Table 3.3.1.5).

Table 3.3.1.5. Seeking/obtaining medical treatment for headaches and migraines.

Nature of Any Difference	Postpubertal	Multiple Age Categories
	Adult	
Males more		
No signif. difference		
Females more	**NORTH AMERICA** *United States*: Andrasik et al. 1979 (young); Linet et al. 1989 (young); Celentano et al. 1990 (young); Cleary et al. 2004:43* (migraines)	**AFRICA** *Zimbabwe*: Levy 1983 **EUROPE** *Britain*: JE Green 1977; Newland et al. 1978; *Denmark*: Rasmussen et al. 1992; *Germany*: T Koehler et al. 1992; *Netherlands*: Post & Gubbels 1986 **NORTH AMERICA** *United States*: Von Korff et al. 1991; Lipton & Stewart 1993

3.3.2. Pain (Excluding Headaches)

A great deal of research has been directed toward identifying gender differences in pain. This research tends to be of two types: experimental and clinical. In the experimental research, subjects are exposed to pain in order to assess their sensitivity. The findings from this research will be explored in Chapter 4. In the tables that follow, the findings from health and clinical settings are reviewed.

3.3.2.1. Pain in General

A substantial number of studies have compared the sexes with respect to all sorts of general feelings of pain. As shown in Table 3.3.2.1, nearly all of these studies have concluded that females experience pain more often than do males. In several of these studies, the researchers disregarded all pain related to gynecological and reproductive factors and still reached the same conclusion.

Table 3.3.2.1. Pain in general.

Nature of Any Difference	Prepubertal	Postpubertal	Multiple Age Categories
	Childhood	Adult	
Males more			
No signif. difference	**NORTH AMERICA** *United States*: Fowler-Kelly & Lander 1991		
Females more	**NORTH AMERICA** *United States*: Fearon et al. 1996	**EUROPE** *Britain*: Neitzert et al. 1997 (controlled for gynecologic & reproductive factors); *Poland*: Eli et al. 2000 (post-operative) **NORTH AMERICA** *United States*: Fishbain et al. 1986 (chronic pain); Verbrugge et al. 1991 (arthritis sufferers); CD Warner 1995 (chest pain perception); Unruh 1996 (controlled for gynecologic & reproductive factors); KJ Berkley 1997 (controlled for gynecologic & reproductive factors); Morin et al. 2000 (post-surgical); Scudds & Robertson 2000 (elderly); Helme & Gibson 2001 (elderly); Koertge et al. 2003:1320 (CAD patients); Leveille et al. 2005:335 (elderly, musculoskeletal)	**NORTH AMERICA** *Canada*: Walters et al. 2002:678 (chronic pain); *United States*: Kroenke & Mangelsdorff 1989 (controlled for gynecological & reproductive factors); Klonoff et al. 1993; Kroenke & Spitzer 1998 (controlled for gynecologic & reproductive factors)

3.3.2.2. Seeking/Obtaining Medical Treatment for Abdominal Pain

The two studies of gender differences in the tendency to seek or obtain medical treatment for abdominal pain were somewhat inconsistent, with one study reporting no significant difference and the other suggesting that females do so more than males (Table 3.3.2.2).

Table 3.3.2.2. Seeking/obtaining medical treatment for abdominal pain.

Nature of Any Difference	Multiple Age Categories
Males more	
No signif. difference	**NORTH AMERICA** *United States*: Von Korff et al. 1991
Females more	**NORTH AMERICA** *United States*: Adelman & Koch 1991

3.3.2.3. Seeking/Obtaining Medical Treatment for Chest Pain

One study indicated that the tendency to seek/obtain medical treatment for chest pain (specifically involving angina) was greater for females than for males (Table 3.3.2.3).

Table 3.3.2.3. Seeking/obtaining medical treatment for chest pain.

Nature of Any Difference					Postpubertal		
						Adult	
Males more							
No signif. difference							
Females more						**NORTH AMERICA** *United States*: Garber et al. 1992 (angina symptoms)	

3.3.2.4. Facial and Oral Pain

Studies of pain in the facial area, particularly around the jaw and mouth, indicate that there is either no gender difference or that females experience such pain more than do males (Table 3.3.2.4).

Table 3.3.2.4. Facial and oral pain.

Nature of Any Difference					Postpubertal		Multiple Age Categories
					Adolescent	Adult	
Males more							
No signif. difference					**EUROPE** *Sweden*: Larsson 1991 **NORTH AMERICA** *United States*: Riolo et al. 1987	**NORTH AMERICA** *United States*: N Lester et al. 1994 (young)	**EUROPE** *Sweden*: Agerberg & Carlsson 1972 **NORTH AMERICA** *Canada*: Locker & Grushka 1987; *United States*: H Taylor & Curran 1985; Ritchey et al. 1991 (homeless persons)
Females more					**EUROPE** *Sweden*: Wanman & Agerberg 1986a; Wanman & Agerberg 1986b; Pilley et al. 1992	**ASIA** *Taiwan*: Shiau & Chang 1992 (young) **EUROPE** *Sweden*: Brattberg et al. 1996 (elderly); Bergh et al. 2003 (elderly) **NORTH AMERICA** *Canada*: Cairns et al. 2001 (pain in jaw when injected with glutamate into the masseter muscle); *United States*: Solberg et al. 1979 (young); Pullinger et al. 1988 (young); FM Bush et al. 1989 (seek treatment); Dworkin et al. 1990 (seek treatment); JA Howard 1991 (seek treatment); JA Lipton et al. 1993 (seek treatment); JL Riley et al. 1998 (elderly); Dao & LeResche 2000	**NORTH AMERICA** *United States*: Reider et al. 1983; Von Korff et al. 1988

3.3.2.5. Seeking/Obtaining Medical Treatment for Facial or Oral Pain

Several studies have compared the sexes with respect to their seeking or obtaining medical attention for facial or oral pain. The results of these studies have roughly split between those indicating that females do so more than males and those suggesting no significant differences (Table 3.3.2.5).

Table 3.3.2.5. Seeking/obtaining medical treatment for facial or oral pain.

Nature of Any Difference							Multiple Age Categories
Males more							
No signif. difference							**NORTH AMERICA** *Canada*: Locker & Grushka 1987; *United States*: H Taylor & Curran 1985; Von Korff et al. 1991
Females more							**EUROPE** *Sweden*: Agerberg & Carlsson 1972 **NORTH AMERICA** *United States*: Helkimo 1976

3.3.2.6. Muscular-Skeletal Pain

Many studies have investigated gender differences in muscular-skeletal pain. Most of these studies have concluded that females suffer from such pain more, although several studies have concluded that there is no significant gender difference (Table 3.3.2.6).

Table 3.3.2.6. Muscular-skeletal pain.

Nature of Any Difference	Prepubertal			Postpubertal		Multiple Age Categories
			Childhood	Adolescent	Adult	
Males more						
No signif. difference				**EUROPE** *Britain*: Naish & Apley 1950 (diagnosed); Fairbank et al. 1984b (diagnosed); *Sweden*: Larsson 1991 (diagnosed) **NORTH AMERICA** *Canada*: P Lee et al. 1985* (diagnosed)	**NORTH AMERICA** *United States*: Lavsky-Shulan et al. 1985 (elderly, diagnosed); Herr 1991 (elderly, diagnosed); N Lester et al. 1994 (young, diagnosed)	**NORTH AMERICA** *United States*: Ritchey et al. 1991 (diagnosed)
Females more			**EUROPE** *Denmark*: Oster & Nielsen 1972 (diagnosis)	**MIDDLE EAST** *Israel*: Buskila et al. 1993 (diagnosed)	**EUROPE** *Finland*: Rajala et al. 1995; *Denmark*: C Jensen et al. 1998 (strain, computer users); C Jensen et al. 2002 (strain, computer users); *Norway*: Hertzberg 1985 (diagnosed) **NORTH AMERICA** *Canada*: P Lee et al. 1985* (full & elderly, diagnosed); SL Hughes et al. 1994 (elderly, joint pain); Magni et al. 1994; *United States*: Unruh 1996 (diagnosis); Scudds & Robertson 1998 (elderly); Affleck et al. 1999 (from arthritis); Gerr et al. 2002 (strain, computer users)	**EUROPE** *Britain*: Croft et al. 1993 (diagnosed); *Netherlands*: PH Jansen et al. 1991 (diagnosed); De Krom et al. 1992 (diagnosed); *Norway*: Ursin et al. 1988 (diagnosed); Hasvold & Johnsen 1993 (diagnosed); *Sweden*: Westerling & Jonsson 1980 (diagnosed); Dimberg et al. 1989 (diagnosed); SJ Linton 1990 (diagnosed); HI Andersson et al. 1993 (diagnosed); Bergman et al. 2001:1375 (diagnosis) **MIDDLE EAST** *Kuwait*: AM Al-Awahdi et al. 2004 **NORTH AMERICA** *Canada*: Mior & Diakow 1987 (diagnosed); *United States*: Cunningham & Kelsey 1984 (diagnosed); H Taylor & Curran 1985 (diagnosed); Magni et al. 1990 (diagnosed); Burchfield et al. 1992 (chemical plant employee, diagnosis) **OCEANIA** *Philippines*: Manahan et al. 1985 (diagnosed)

3.3.2.7. Seeking/Obtaining Medical Treatment for Muscular or Skeletal Pain

Studies concerning gender differences in seeking or obtaining medical treatment for muscular or skeletal pain have provided somewhat inconsistent answers, with most indicating that females are more likely than males to do so (Table 3.3.2.7).

Table 3.3.2.7. Seeking/obtaining medical treatment for muscular or skeletal pain.

Nature of Any Difference				Postpubertal		Multiple Age Categories
				Adolescent		
Males more				**EUROPE** *Britain*: Fairbank et al. 1984b		
No signif. difference						
Females more						**EUROPE** *Finland*: Rekola et al. 1993; *Sweden*: Linton 1990 **NORTH AMERICA** *United States*: H Taylor & Curran 1985

3.3.2.8. Back Pain

Back pain is one of the most common reasons people seek medical attention. Table 3.3.2.8 indicates that females suffer from back pain more than males, although several studies have failed to find any significant sex difference.

Table 3.3.2.8. Back pain.

Nature of Any Difference					Postpubertal		Multiple Age Categories
					Adolescent	Adult	
Males more							**EUROPE** *Finland*: Rekola et al. 1993 (consultation)
No signif. difference					**EUROPE** *Switzerland*: Balague et al. 1988 (consultation) **NORTH AMERICA** *United States*: TL Olsen et al. 1992 (consultation)	**EUROPE** *Norway*: Finsen 1988* (elderly, diagnosed); *Sweden*: Saraste & Hultman 1987 (diagnosed); Linton 1990* (consultation)	**EUROPE** *Britain*: Fairbank et al. 1984a* (diagnosed); *Finland*: Heliovaara et al. 1989 (diagnosed); K Walsh et al. 1992* (diagnosed); *Denmark*: Pedersen et al. 1975 (blue collar workers; diagnosed) Biering-Sorensen 1982 (diagnosed); Biering-Sorensen 1983 (diagnosed); *Norway*: Hertzberg 1985* (diagnosed); Finsen 1988* (diagnosed); *Sweden*: Linton 1990* (diagnosed); Andersson et al. 1993 (diagnosed) **NORTH AMERICA** *Canada*: JR Brown 1975 (diagnosed); P Lee et al. 1985 (diagnosed); Abenhaim & Suissa 1987 (workman's compensation, diagnosed); Mior & Diakow 1987 (diagnosed); *United States*: Cypress 1983 (consultation); Deyo & Tsui-Wu 1987 (diagnosed); Von Korff et al. 1991 (consultation); Burchfield et al. 1992 (chemical plant workers, diagnosed); Cleary et al. 2004:43* (backaches) **OCEANIA** *Philippines*: Manahan et al. 1985 (diagnosed)
Females more					**EUROPE** *Britain*: Fairbank et al. 1984a* (consultation); *Finland*: Salminen et al. 1992 (diagnosed); *Switzerland*: Balague et al. 1988 (diagnosed)	**EUROPE** *Belgium*: Skovron et al. 1994; *Britain*: K Walsh et al. 1992* (diagnosed); *France*: Pietri et al. 1992 (diagnosed); *Norway*: Hertzberg 1985* (young, diagnosed); Finsen 1988* (elderly, diagnosed); *Sweden*: B Scott et al. 2000 (elderly, Parkinsons patients, debut of symptoms) **NORTH AMERICA** *United States*: Lavsky-Shulan et al. 1985 (consultation, elderly); Ritchey et al. 1991 (homeless person, diagnosed); N Lester et al. 1994 (young, diagnosed); CE Sheffer et al. 2002; Murtagh & Hubert 2004 (elderly)	**EUROPE** *Britain*: K Walsh et al. 1992* (consultation); *Czechoslovakia*: Nohejl et al. 1987 (diagnosed); *Sweden*: Rundcrantz et al. 1991 (dentists, diagnosed) **NORTH AMERICA** *Canada*: J Brown 1975 (diagnosed); Walters et al. 2002:687; *United States*: Nagi et al. 1973 (diagnosed); Reisbord & Greenland 1985 (diagnosed); Taylor & Curran 1985 (diagnosed); Von Korff et al. 1988 (diagnosed); Simoni-Wastila 2000:291 (diagnosed) **OCEANIA** *New Zealand*: Laslett et al. 1991 (diagnosed)

3.3.2.9. Seeking/Obtaining Medical Treatment for Back Pain

Back pain is common in the human species, owing in part to the fact that sensitive nerves are found between each of our vertebrae. Table 3.3.2.9 shows that several studies have sought to determine if there is a sex difference in the tendency to seek or obtain medical treatment for such pain, and that the results have been quite mixed, with most concluding that any differences are insignificant.

Table 3.3.2.9. Seeking/obtaining medical treatment for back pain.

Nature of Any Difference					Postpubertal		Multiple Age Categories
					Adolescent	Adult	
Males more						**NORTH AMERICA** *United States*: Lavsky-Shulan et al. 1985 (elderly)	**EUROPE** *Finland*: Rekola et al. 1993
No signif. difference					**EUROPE** *Switzerland*: Balague et al. 1988 **NORTH AMERICA** *United States*: TL Olsen et al. 1992	**EUROPE** *Norway*: Finsen 1988 (Elderly); *Sweden*: Linton 1990	**NORTH AMERICA** *United States*: Cypress 1983; Von Korff et al. 1991; Burchfield et al. 1992 (chemical plant employees)
Females more					**EUROPE** *Britain*: Fairbank et al. 1984a		**EUROPE** *Britain*: K Walsh et al. 1992

3.3.2.10. Patellofemoral Pain

Patellofemoral pain is a common knee problem. Those who have this condition usually feel pain under and around your kneecap. The pain can get worse when one is active or when one is sitting for a long time. As shown in Table 3.3.2.10, this condition is more commonly diagnosed in females than in males.

Table 3.3.2.10. Patellofemoral pain.

Nature of Any Dif-ference					Postpubertal		Multiple Age Categories
					Adolescent	Adult	
Males more							
No signif. difference							
Females more					**NORTH AMERICA** *United States*: Sandow & Goodfellow 1985	**EUROPE** *Sweden*: Thomee et al. 1995 (young) **NORTH AMERICA** *United States*: Arendt 1994 (athletes); CL Baker 1997 (athletes); Beim 1999 (athletes); Csintalan et al. 2002	**NORTH AMERICA** *United States*: Dehaven & Lintner 1986 (athletes)

3.3.3. Sleep Disorders

As a vital process in most animals, sleep helps the brain and the rest of the body to rejuvenate itself after many hours of activity. For some people, there are various difficulties surrounding sleep. Evidence of sex differences in these disorders is reviewed below.

3.3.3.1. Sleep Problems/Disorders in General

Research pertaining to possible sex differences in the prevalence of sleep difficulties has come to somewhat inconsistent conclusions. However, it appears that males have more difficulty sleeping if they are heart disease patients who have had surgery than compared with females. Among persons in general, the findings have been contradictory (Table 3.3.3.1).

Table 3.3.3.1. Sleep problems/disorders in general.

Nature of Any Difference					Postpubertal		Multiple Age Categories
					Adolescent	Adult	
Males more						**NORTH AMERICA** *United States*: KB King et al. 1994 (heart disease patients after coronary bypass surgery); Artinian & Duggan 1995 (heart disease patients after bypass surgery); Vaccarino et al. 2003 (heart disease patients after surgery)	**NORTH AMERICA** *United States*: CE Ross & Bird 1994 (self-diagnosed)
No signif. difference							
Females more					**ASIA** *Japan*: Ohida et al. 2004 **NORTH AMERICA** *United States*: Ingersoll et al. 1993:73 (diagnosis)	**NORTH AMERICA** *United States*: Luthar et al. 1996:182 (opiate addicts, retrospective childhood recollections); Cleary et al. 2004:43* (sleeping problems)	

3.3.3.2. Insomnia

Insomnia involves chronic difficulty getting to sleep once one has gone to bed. The research has been very consistent in indicating that insomnia is more common among females than among males (Table 3.3.3.2).

Table 3.3.3.2. Insomnia.

Nature of Any Difference						Postpubertal
						Adult
Males more						
No signif. difference						
Females more						**ASIA** *China*: Li et al. 2002 **EUROPE** *Britain*: Hohagen et al. 1993 **NORTH AMERICA** *United States*: Bixler et al. 1979; Mellinger et al. 1985; Klink et al. 1992; Kroenke & Price 1993; Reyner et al. 1995; E Lindberg et al. 1997; Ohayon et al. 2001

3.3.3.3. Sleep Apnea

Sleep apnea is defined as the cessation of breathing during sleep. Sufferers often experience a sudden awakening or loud snoring near the end of an apneatic episode. Studies of gender differences in the incidence of sleep apnea have consistently concluded that the disorder is more prevalent among males than among females (Table 3.3.3.3).

Table 3.3.3.3. Sleep apnea.

Nature of Any Difference					Postpubertal		Multiple Age Categories
						Adult	
More in males						**EUROPE** *Sweden*: L Larsson et al. 2003 (self-report) **NORTH AMERICA** *United States*: AJ Block et al. 1979* (diagnosis); T Young et al. 1993* (survey, hypopnea); LG Olson et al. 1995 (hypopnea); Kripke et al. 1997 (survey)	**NORTH AMERICA** *Canada*: C O'Connor et al. 2000:1467 (diagnosis); *United States*: AJ Block et al. 1979* (diagnosis); Guilleminault et al. 1992 (diagnosis); Guillaminault et al. 1993 (diagnosis); JE Kass et al. 1996 (diagnosis); R Young et al. 1996 (survey)
No signif. difference							
More in females							

3.3.3.4. Narcolepsy

Persons afflicted by narcolepsy will suddenly fall asleep during routine daily activities. Research has not shown a consistent gender difference in the prevalence of narcolepsy (Table 3.3.3.4).

Table 3.3.3.4. Narcolepsy.

Nature of Any Difference					Postpubertal		Multiple Age Categories
						Adult	
More in males						**EUROPE** *Germany*: Dodel et al. 2004:1125 (clinical sample)	
No signif. difference							**EUROPE** *Several European Countries*: Ohayon et al. 2002 **NORTH AMERICA** *United States*: Hublin et al. 1994
More in females						**ASIA** *Japan*: Y Doi & Minowa 2003 (daytime sleepiness)	

3.3.4. Other Types of Minor Ailments

Minor ailments that failed to be subsumed under any other category for which sex differences have been reported are presented below.

3.3.4.1. Minor Ailments in General/Somatoform Disorders

Various minor ailments involving general feelings of bodily discomfort and weakness have been studied, nearly all of which have found females exhibiting more such symptoms than males (Table 3.3.4.1).

Table 3.3.4.1. Minor ailments in general/somatoform disorders.

Nature of Any Difference					Postpubertal		Multiple Age Categories
						Adult	
More in males							
No signif. difference						**NORTH AMERICA** *United States*: Barsky et al. 1993 (bodily discomfort)	
More in females						**EUROPE** *Netherlands*: Gijsbers van Wijk 1991 (medical symptoms, controlled for Ob-Gyn factors); Portegijs et al. 1996 (somatoform disease); Gijsbers van Wijk & Kolk 1997 (sensitive to symptoms of ill-health); *Spain*: E Fernandez et al. 1999 **NORTH AMERICA** *United States*: Verbrugge 1980b (college, bodily discomfort); Verbrugge 1982a (bodily discomfort); Hibbard & Pope 1983 (medical symptoms); Swartz et al. 1986 (somatoform disease); Escobar et al. 1987a (somatoform disease); Escobar et al. 1987b; Escobar et al. 1989 (somatoform disease); Pennebaker & Roberts 1992 (bodily discomfort); Kroenke & Price 1993 (fatigue); GR Smith 1995 (somatoform disease); Toner et al. 1995 (somatoform disease); Kroenke et al. 1997 (somatoform disease)	**NORTH AMERICA** *United States*: Swartz et al. 1991a (somatoform disorder); Kroenke & Spitzer 1998 (medical symptoms)

3.3.4.2. Coughing

Two studies among smokers concluded that coughing was more frequent among female smokers than male smokers (Table 3.3.4.2).

Table 3.3.4.2. Coughing.

Nature of Any Difference					Postpubertal	
						Adult
More in males						
No signif. difference						
More in females						**ASIA** *Hong Kong*: Lam et al. 1998 (among smokers) **EUROPE** *Norway*: Holmen et al. 2002 (among smokers)

3.3.4.3. Fainting

Studies of fainting have either concluded that females succumb more than males or that there are no significant gender differences in the probability of fainting (Table 3.3.4.3).

Table 3.3.4.3. Fainting.

Nature of Any Difference					Postpubertal	
						Adult
More in males						
No signif. difference						**EUROPE** *Britain*: Greenbury 1942 (blood injuries); Williams 1942 (after blood loss due to injuries) **NORTH AMERICA** *United States*: Kaspirin et al. 1992 (after blood loss due to injuries)
More in females						**NORTH AMERICA** *United States*: Kroenke & Price 1993 (after dizziness & fainting)

3.3.4.4. Hemorrhoids

Hemorrhoids involve the formation of nodule growths around the anus. The one available study failed to find a significant gender difference in the incidence of hemorrhoids (Table 3.3.4.4).

Table 3.3.4.4. Hemorrhoids.

Nature of Any Difference					Postpubertal	
						Adult
More males						
No signif. difference						**NORTH AMERICA** *United States*: Cleary et al. 2004:43 (diagnosis)
More females						

3.3.4.5. Hypochondria

Hypochondria has to do with having a variety of health-related complaints that physicians are unable to trace to any specific physical causes. The available research has failed to find any significant gender differences in hypochondria (Table 3.3.4.5).

Table 3.3.4.5. Hypochondria.

Nature of Any Difference					Postpubertal	
						Adult
Males more						
No signif. difference						**EUROPE** *Spain*: Hernandez & Kellner 1992 **NORTH AMERICA** *United States*: Barsky et al. 1986; Barsky et al. 1990; Kirmayer & Robbins 1991
Females more						

3.3.4.6. Incontinence

Incontinence involves difficulty controlling urination. As shown in Table 3.3.4.6, most studies have found incontinence to be more common among females than males.

Table 3.3.4.6. Incontinence.

Nature of Any Difference					Postpubertal	
						Adult
More males						**ASIA** *Korea*: Lapitan 2001*
No signif. difference						**ASIA** *Hong Kong*: Lapitan 2001*; *Taiwan*: Lapitan 2001*
More females						**ASIA** *Hong Kong*: Lee 2004 (elderly); *Japan*: Ueda et al. 2000 **EUROPE** *Britain*: TM Thomas et al. 1980 **NORTH AMERICA** *United States*: Diokno et al. 1986 (middle-age adult); Jirovee et al. 1999; DuBeau 2000 (elderly); Fultz & Herzog 2001 (elderly)

3.3.4.7. Motion Sickness

Motion sickness (also called kinetosis) is characterized by nausea and sometimes vomiting induced by motion (as in air, car, or ship travel). Studies have consistently indicated that more females suffer from motion sickness than do males (Table 3.3.4.7).

Table 3.3.4.7. Motion Sickness.

Nature of Any Difference					Postpubertal	
						Adult
Males more						
No signif. difference						
Females more						**NORTH AMERICA** *United States*: Lentz & Collins 1977; Mirabile & Ford 1982; AH Park & Hu 1999 (aviation test); Levine & Stern 2002 (college)

3.3.4.8. Nausea and Vomiting

Numerous studies have documented that vomiting as well as feelings of nausea (which often preceds vomiting) are more common among females than among males (Table 3.3.4.8).

Table 3.3.4.8. Nausea and vomiting.

Nature of Any Difference					Postpubertal	
						Adult
Male levels higher						
No signif. difference						
Female levels higher						**ASIA** *China*: Liaw et al. 2001 (nausea due to chemotherapy, cancer patients); Liaw et al. 2003 (nausea due to chemotherapy, cancer patients) **EUROPE** *Germany*: Klosterhalfen et al. 2005:337 (nausea due to motion sickness after experiencing rotation) **NORTH AMERICA** *United States*: Jokerst et al. 1999 (nausea due to motion sickness after experiencing rotation); AH Park & Hu 1999 (nausea due to motion sickness after experiencing rotation); CJ Friedman et al. 2000 (nausea due to chemotherapy, cancer patients); OY Lee et al. 2001 (persons with IBS); Cheung & Hofer 2002 (nausea due to motion sickness after experiencing rotation)

3.3.4.9. Physical Disabilities/Limitations

Most studies of persons with a wide range of disabilities have been confined to the elderly. As shown in Table 3.3.4.9, most of these studies have concluded that females are more often than males to be disabled.

Table 3.3.4.9. Physical disabilities/limitations.

Nature of Any Dif-ference					Postpubertal	
					Adolescent	Adult
More in males						**EUROPE** *Bulgaria*: VH Akabaliev & Sivkov 2003 (30-year-olds, small physical anomalies)
No signif. difference						
More in females					**NORTH AMERICA** *United States*: JM McNeil 1997; SS Merrill et al. 1997	**EUROPE** *Several European Countries*: Schroll et al. 1996 (elderly, self-reports) **LATIN AMERICA** *Brazil*: Barreto et al. 2004 (elderly) **MIDDLE EAST** *Israel*: Fuchs et al. 1998 (elderly, self-reports) **NORTH AMERICA** *United States*: Guralnik et al. 1989 (elderly); Guralnik & Simonsick 1993 (elderly); Hubert et al. 1993 (elderly, self-reports); Penning & Strain 1994 (elderly, self-reports); Beckett et al. 1996 (elderly, self-reports); Merrill et al. 1997 (elderly); S Arber & Cooper 1999 (elderly); VA Campbell et al. 1999 (elderly); Oman et al. 1999 (self-reports); Ferrucci et al. 2000 (elderly, self reports); Leveille et al. 2000a (elderly, self-reports); Leveille et al. 2000b; Wray & Blaum 2001 (elderly, self-reports); Murtagh & Hubert 2004 (elderly, self-reports)

3.3.4.10. Restless Leg Syndrome

Restless leg syndrome (RLS) affects up to 10% of American adults. The disorder interferes with one’s ability to rest and relax when sitting or lying down. According to all of the available research, the condition is more prevalent in females than in males (Table 3.3.4.10).

Table 3.3.4.10. Restless leg syndrome.

Nature of Any Difference					Postpubertal	
						Adult
Males more						
No signif. difference						
Females more						**NORTH AMERICA** *Canada*: Lavigne & Montplaisir 1994**;** *United States*: Winkelmann et al. 2000; RP Allen et al. 2003; M Hanson et al. 2004:1399

3.3.4.11. Restless Leg Syndrome, Age of Onset

The one available study concluded that among persons with RLS, females notice symptoms at an earlier average age than males with the disorder (Table 3.3.4.11).

Table 3.3.4.11. Restless leg syndrome, age of onset.

Nature of Any Difference					Postpubertal	
						Adult
Males earlier						
No signif. difference						
Females earlier						**NORTH AMERICA** *United States*: M Hanson 2004:1399

3.3.4.12. Susceptibility to Infection

As indicated in Table 3.3.4.12, males appear to be more susceptible to infection than females. Most of the pertinent studies have involved injury victims and surgery patients.

Table 3.3.4.12. Susceptibility to infection.

Nature of Any Difference	Prepubertal				Postpubertal		Multiple Age Categories
			Early Childhood		Adolescent	Adult	
More in males			**NORTH AMERICA** *United States*: B Childs 1965; T Washburn et al. 1965*		**NORTH AMERICA** *United States*: Barrow & Herndon 1990 (burn injury patients)	**NORTH AMERICA** *United States*: Offner et al. 1999 (injury patients)	**NORTH AMERICA** *United States*: Washburn et al. 1965*; McGowen et al. 1975 (surgery patients); Bone 1992 (following surgery); Schroder et al. 1998 (following surgery)
No signif. difference							
More in females							

3.3.4.13. Thyroid Disease (Except Thyroid Cancer)

Three studies of various types of non-cancerous thyroid diseases have all concluded that they are more common among females than males (Table 3.3.4.13).

Table 3.3.4.13. Thyroid disease (except thyroid cancer).

Nature of Any Difference					Postpubertal		Multiple Age Categories
						Adult	
Males more							
No signif. difference							
Females more						**NORTH AMERICA** *United States*: Hoffenberg 1987 (thyrotoxicosis); Cleary et al. 2004:43*	**NORTH AMERICA** *United States*: Whybrow 1995 (diagnosed)

3.3.4.14. Tooth Decay/Dental Cavities

Research findings having to do with gender differences in the rate of tooth decay are not consistent (Table 3.3.4.14).

Table 3.3.4.14. Tooth decay/dental cavities/dental caries.

Nature of Any Difference	Prepubertal	Postpubertal	Multiple Age Categories
	Childhood	Adult	
Males more	**EUROPE** *Sardinia*: Campus et al. 2001	**NORTH AMERICA** *United States*: Desvarieux et al. 2004*:2032 (periodontal infections)	**NORTH AMERICA** *United States*: National Institute of Dental Research 1987 (employed persons & elderly, periodontal infections)
No signif. difference		**EUROPE** *Britain*: Office of Population Censuses 1988 (elderly tooth loss) **NORTH AMERICA** *United States*: Desvarieux et al. 2004*:2032 (tooth loss)	**NORTH AMERICA** *United States*: Cleary et al. 2004:43* (teeth problems)
Females more	**NORTH AMERICA** *United States*: Klein & CE Palmer 1937		

3.3.4.15. Urinary/Bladder Problems

One study of urinary/bladder problems concluded that they were more prevalent in females than in males (Table 3.3.4.15).

Table 3.3.4.15. Urinary/bladder problems.

Nature of Any Difference	Postpubertal
	Adult
More in males	
No signif. difference	
More in females	**NORTH AMERICA** *United States*: Cleary et al. 2004:43

3.3.4.16. Varicose Veins

One study reported that varicose veins were more pronounced among females than males, although a second study concluded that no significant sex difference could be identified (Table 3.3.4.16).

Table 3.3.4.16. Varicose veins.

Nature of Any Difference	Multiple Age Categories
More in males	
No signif. difference	**NORTH AMERICA** *United States*: Cleary et al. 2004:43*
More in females	**NORTH AMERICA** *United States*: M Lake et al. 1942

3.3.4.17. Vitamin D Deficiency

The minimal amount of research concerning sex differences in vitamin D deficiency suggested that females suffered from the condition more than males (Table 3.3.4.17).

Table 3.3.4.17. Vitamin D deficiency.

Nature of Any Difference	Multiple Age Categories
More in males	
No signif. difference	
More in females	**EUROPE** *Norway*: HE Meyer et al. 2004:414

Chapter 4

PERCEPTUAL, MOTOR, AND EMOTIONAL FACTORS

In this chapter, the findings having to do with gender differences in sensation, perception, motor skills, and emotions are reviewed.

4.1

PERCEPTUAL FACTORS

Perceptual factors are those having to do with hearing, seeing, tasting, smelling, and feeling. Considerable research has sought to determine if males and females differ in their perceptual tendencies.

4.1.1. Auditory Perceptions

Auditory perception has to do with the ability to hear. Some variables of an auditory nature that have been studied with reference to sex differences simply involve how sensitive one is to sound, while others have to do with the ability to detect subtle changes in pitch. Still other auditory phenomena involve tendencies to sometimes hear sounds that no one else hears (auditory hallucinations).

4.1.1.1. Auditory Acuity

Auditory acuity pertains to the clarity with which one hears. Table 4.1.1.1 indicates that during infancy, the sexes are virtually equal in their sensitivity to sounds. However, from childhood onward, auditory acuity appears to be greater for females than for males.

Table 4.1.1.1. Auditory acuity.

Nature of Any Difference	Prepubertal		Postpubertal	Multiple Age Categories
	Infant	Childhood	Adult	
Males more	**NORTH AMERICA** *United States*: Stubbs 1934*			
No signif. difference	**LATIN AMERICA** *Uruguay*: Horowitz 1973* **NORTH AMERICA** *United States*: Birns 1965 (neonate); Simner 1971; Horowitz 1973*; Bench et al. 1974 (neonate); J Brown et al. 1975; Porges et al. 1977; Brackbill & Schroder 1980			
Females more	**NORTH AMERICA** *United States*: Stubbs 1934* (respiratory response); Watson 1969; S Friedman & Jacobs 1981 (neonate)	**NORTH AMERICA** *United States*: Cicco & Palmer 1941; Eagles et al. 1963; CD Elliot 1971; Hull et al. 1971; McGuiness 1972*	**NORTH AMERICA** *United States*: Schaie et al. 1964 (elderly); Pishkin & Shurley 1965; JE Garai & Scheinfeld 1968; D McGuiness 1972* (repetitious noise such as ticking clocks, young); Ingrisano et al. 1980 (determining sex of children by listening to speech); Schaie et al. 1987 (elderly); Velle 1987 (especially at higher frequencies); TL Perry et al. 2001 (gender of a voice)	**NORTH AMERICA** *United States*: Corso 1959

4.1.1.2. Change in Auditory Activity With Age

One study of auditory emissions by mice concluded that males curtail their emissions more than do females as they age (Table 4.1.1.2).

Table 4.1.1.2. Change in auditory activity with age.

Nature of Any Difference	Citation
Males more	**RODENT** *Mouse*: Guimaraes et al. 2004 (reduction)
No signif. difference	
Females more	

4.1.1.3. Otoacoustic Emissions

Otoacoustic emissions are inaudible sounds produced by the outer hair cells of the inner ear. "Echoes" from these emissions can be recorded with special sensing equipment. One study concluded that females exhibit more pronounced otoacoustic emissions than do males (Table 4.1.1.3).

Table 4.1.1.3. Otoacoustic emissions.

Nature of Any Difference	Postpubertal
More in males	
No signif. difference	
More in females	**NORTH AMERICA** *United States*: McFadden & Shubel 2003 (college, otoacoustic emissions)

4.1.1.4. Pitch Discrimination

Sound varies not only in terms of its loudness but also in pitch. Most adult humans are able to detect pitch within the range of 20 to 20,000 Hertz. Table 4.1.1.4 suggests that there may be no sex difference in young adults, but, among full adults, females have an advantage at pitch discrimination.

Table 4.1.1.4. Pitch discrimination.

Nature of Any Difference	Prepubertal	Postpubertal	Multiple Age Categories
	Childhood	Adult	
Males better			
No signif difference		**NORTH AMERICA** *United States*: D McGuinness 1972 (young)	
Females better	**NORTH AMERICA** *United States*: Ciocco 1938 (high pitched sounds)	**NORTH AMERICA** *United States*: Sachs et al. 1973 (adult); T Murry & Singh 1980 (adult); ML Andrews & Schmidt 1996 (adult)	**NORTH AMERICA** *United States*: Beasley 1938 (high pitched sounds)

4.1.1.5. Pure Tone Detection

Pure tone detection refers to the detection of single frequency tone of sound without harmonic content. In acoustic terms, "harmonic" describes a sound whose frequency is the multiple of a number of fundamental frequencies. It is measured by an audiometric device. According to one study, females are better than males at pure tone detection (Table 4.1.1.5).

Table 4.1.1.5. Pure tone detection.

Nature of Any Difference	Postpubertal
	Adult
Males better	
No signif. difference	
Females better	**NORTH AMERICA** *United States*: JE Garai & Scheinfeld 1968 (singing)

4.1.1.6. Responsiveness to Speech

According to one study of infants, females respond more to adult speech than do males (Table 4.1.1.6).

Table 4.1.1.6. Responsiveness to speech.

Nature of Any Difference	Prepubertal
	Infant
Males more responsive	
No signif. difference	
Females more responsive	**NORTH AMERICA** *United States*: Gunnar & Donahue 1980 (6, 9, & 12 month olds)

4.1.1.7. Auditory Hallucinations

Hallucinations are often described as distorted perceptions that only a single individual experiences. In the case of auditory hallucinations, the person hears sounds such as music or voices the experience of which is not shared with anyone else in the vicinity. Auditory hallucinations are commonly associated with diagnosed schizophrenia as well as with various religious experiences. Table 4.1.1.7 indicates more females have auditory hallucinations than do males, particularly among schizophrenics.

Table 4.1.1.7. Auditory hallucinations.

Nature of Any Difference	Postpubertal	Multiple Age Categories
	Adult	
Males more		
No signif. difference		
Females more	**NORTH AMERICA** *United States*: Rector & Seeman 1996 (schizophrenics)	**EUROPE** *Sweden*: Marneros 1984 (schizophrenics) **NORTH AMERICA** *United States*: RE Gur et al. 1996

4.1.1.8. Right/Left Ear Advantage

The so-called right/left ear advantage refers to the tendency for some people to better detect or decipher auditory information when it is presented in one ear rather than in the other, especially when competing sounds are being presented to both ears at the same time. Studies of gender differences in the right/left ear advantage have all concluded that relative to females, males are better able to decipher information (particularly of a linguistic nature) when it is presented in the right ear (Table 4.1.1.8). Since the right ear is primarily being monitored by the left brain hemisphere, this greater right ear advantage for males is probably reflecting the greater tendency for males to segregate the functioning of each hemisphere.

Table 4.1.1.8. Right/left ear advantage.

Nature of Any Difference	Postpubertal
	Adult
Males have more of a right ear advantage	**EUROPE** *Britain*: Govier & Bobby 1994; Govier & Boden 1997; *Netherlands*: Cohen-Kettenis et al. 1998 **NORTH AMERICA** *Canada*: Harshman et al. 1983; *United States*: Lake & Bryden 1976 (verbal stimuli); Piazza 1980 (verbal stimuli); Hugdahl & Anderason 1984; Hiscock & MacKay 1985; Weekes et al. 1995 (college); Voyer 1996b
No signif. difference	
Females have more of a right ear advantage	

4.1.1.9. Right/Left Ear Advantage, Improvement in With Practice

Even though males exhibit a greater right ear advantage (see table above), the two studies of how well people improve with practice both suggest that females surpass males in this regard (Table 4.1.1.9).

Table 4.1.1.9. Right/left ear advantage.

Nature of Any Difference					Postpubertal
					Adult
Males have more of a right ear advantage					**EUROPE** *Britain*: Govier & Bobby 1994; Govier & Boden 1997; *Netherlands*: Cohen-Kettenis et al. 1998 **NORTH AMERICA** *Canada*: Harshman et al. 1983; *United States*: Lake & Bryden 1976 (verbal stimuli); Piazza 1980 (verbal stimuli); Hugdahl & Andreason 1984; Hiscock & MacKay 1985; Weekes et al. 1995 (college); Voyer 1996b
No signif. difference					
Females have more of a right ear advantage					**NORTH AMERICA** *United States*: Wexler & Lipman 1988 (women improve more with practice); Munro & Gomier 1993 (women improve more with practice)

4.1.1.10. Dichotic Listening

Dichotic listening tasks involve having subjects wear earphones and then listen to different types of stimuli into each ear. A study in which males and females were compared on these tasks indicated that males were significantly better than females at correctly identifying nonlinguistic sounds, but that no significant gender difference existed regarding linguistic sounds (Table 4.1.1.10).

Table 4.1.1.10. Dichotic listening.

Nature of Any Difference	Prepubertal					
				Childhood		
Males better				**NORTH AMERICA** *Canada*: Knox & Kimura 1970* (nonverbal sounds)		
No signif. difference				**NORTH AMERICA** *Canada*: Knox & Kimura 1970* (verbal sounds)		
Females better						

4.1.2. Tactile Perceptions

Tactile perceptions are those made possible by millions of nerve endings close to the surface of the skin. Research findings on sex differences in various aspects of tactile perceptions are reviewed below.

4.1.2.1. Tactile Discrimination

Research surrounding sex differences in the ability to accurately discriminate tactile stimuli has reached very inconsistent conclusions (Table 4.1.2.1).

Table 4.1.2.1. Tactile discrimination.

Nature of Any Difference					Postpubertal		Multiple Age Categories
						Adult	
Males more						**OCEANIA** *Australia*: Ernst 1987 (elderly)	**NORTH AMERICA** *United States*: Heaton et al. 1986 (ages 15-81)
No signif. difference						**NORTH AMERICA** *United States*: King et al. 1978 (college); Dodrill 1979; Filskon & Cantanese 1986; Thompson et al. 1987	**NORTH AMERICA** *Canada*: Fromm-Auch & Yeudall 1983 (ages 15-64); Yeudall et al. 1987 (ages 15-40)
Females more						**NORTH AMERICA** *United States*: Fabian et al. 1981 (alcoholics); Chavez et al. 1982 (college); Gordon & O'Dell 1983 (college)	

4.1.2.2. Tactile Sensitivity

Tactile sensitivity refers to an individual's abilities to detect objects touching the skin. Often times, subjects are blindfolded and then stroked lightly with a feather on the back of the hand or arm to assess this sensitivity. As shown in Table 4.1.2.2, females appear to be more tactically sensitive than males throughout life.

Table 4.1.2.2. Tactile sensitivity.

Nature of Any Difference	Prepubertal		Postpubertal
	Infant	Toddler	Adult
Males more	**NORTH AMERICA** *United States*: Gatewood & Weiss 1930 (higher respiration rate/physiologically reactive)		
No signif. difference			
Females more	**NORTH AMERICA** *United States*: LP Lipsitt 1959a; Lipsitt 1959b; RQ Bell & Coastello 1964; RQ Bell & Darling 1965	**NORTH AMERICA** *United States*: Gliner 1967	**EUROPE** *Britain*: Galton 1894

4.1.2.3. Thermal Sensitivity

Thermal sensitivity has to do with temperature sensation, primarily of the skin. Most studies involve altering temperatures near the skin, and asking subjects to report when they detect these alterations. On the basis of limited research, Table 4.1.2.3 suggests that males and females are equally sensitive to temperature changes.

Table 4.1.2.3. Thermal sensitivity.

Nature of Any Difference	Postpubertal
	Adult
Males better	
No signif. difference	**NORTH AMERICA** *Canada*: Lautenbacher & Rollman 1993 (college)
Females better	

4.1.3. Taste and Olfactory Perceptions

Research surrounding gender differences in the perceptions of taste and smell are presented in the following tables.

4.1.3.1. Taste Acuity/Sensitivity

Taste sensation is related to eating. Humans are able to discriminate five basic qualities of taste: bitter, sour, sweet, salt, and unami. Female subjects appear to be more sensitive to tastes, except possibly in the case of saltiness (Table 4.1.3.1).

Table 4.1.3.1. Taste acuity/sensitivity.

Nature of Any Difference	Prepubertal	Postpubertal	Multiple Age Categories
	Infant	Adult	
Males more		**EUROPE** *Britain*: EH Bailey & Nichols 1888* (young, saltiness)	
No signif. difference			
Females more	**NORTH AMERICA** *United States*: Nisbett & Gurivetz 1970 (sweetness)	**EUROPE** *Britain*: EH Bailey & Nichols 1888* (young, bitter, sour, & sweet) **NORTH AMERICA** *United States*: Langwell 1949; Soltan & Bracken 1958*; Panghorn 1959 (young); GE Garai & Scheinfeld 1968 (bitter tastes);RE Nisbett & Gurivitz 1970; Velle 1987 (greater gustatory sensitivity); Dalton et al. 2002 (greater gustatory sensitivity)	**NORTH AMERICA** *United States*: Soltan & Bracken 1958*

4.1.3.2. Olfactory Acuity/Sensitivity

In many species, smell is an extremely keen sense. Table 4.1.3.2 suggests that in humans, females are more sensitive to most odors than are males. However, among rats, males appear to be more sensitive.

It is worth noting that several studies were specific to a particular odor or category of odor. For example, a couple of studies were undertaken regarding the abilities to detect exaltolide, a synthetic musk. These studies indicate that no sex difference exists prior to puberty, but that afterward, females were more likely to detect this substance when it was present than were males.

Table 4.1.3.2. Olfactory acuity/sensitivity.

Nature of Any Difference	Prepubertal				Postpubertal		Multiple Age Categories
				Childhood	Adolescent	Adult	
Males more							**RODENT** *Rat*: Pietra & Moulton 1974; RN Hughes 1999
No signif. difference				**EUROPE** *France*: LeMagnen 1950* (exaltolide); LeMagnen 1952* (exaltolide)		**SUIDAE** *Pig*: KM Dorries et al. 1995* (sensitivity to geraniol odor)	**EUROPE** *Sweden*: Larsson et al. 2000 **NORTH AMERICA** *United States*: WS Cain & Gent 1991 (nonbiological odors)
Females more					**EUROPE** *France*: LeMagnen 1952* (exaltolide)	**EUROPE** *France*: LeMagnen 1950* (young, exaltolide); *Germany*: Kobal et al. 2000 (nonbiological odor); *Netherlands*: Hulshoff Pol et al. 2000 (inorganic odor); *Sweden*: Oberg et al. 2002 **NORTH AMERICA** *United States*: Koelega 1970 (biological odors); Punter 1983 (nonbiological odors); Velle 1987 (greater olfactory sensitivity); Wysocki & Beauchamp 1984 (androstenone); Deems & Doty 1987 (phenyl ethyl alcohol); NL Segal et al. 1995 (twins, nonbiological odors); Herz & Cahill 1997 (young); Nawab et al. 2000 (nonbiological odors); P Dalton et al. 2002* (nonbiological odors); P Dalton et al. 2002* (greater olfactory sensitivity); Postolache et al. 2002 **INTERNATIONAL** *Multiple countries*: Schleidt et al. 1981 (body odor) **SUIDAE** *Pig*: KM Dorries et al. 1995* (odor of androstenone)	**EUROPE** *Britain*: Wedekind et al. 1995 (during mate selection) **NORTH AMERICA** *United States*: Schneider & Wolf 1955; Soltan & Bracken 1958; Koelega & Koster 1974; Doty et al. 1984

4.1.3.3. Odor Discrimination

The ability to discriminate between closely related odors has been investigated with respect to gender differences, and most of these studies have found that females are better able to make find odor discriminations than are males (Table 4.1.3.3).

Table 4.1.3.3. Odor discrimination.

Nature of Any Difference				Postpubertal		
				Adolescent	Adult	
Males more						
No signif. difference				**NORTH AMERICA** *United States*: Goel & Grasso 2004 (college, lavender)	**EUROPE** *Germany*: Kobal et al. 2000 (nonbiological odors); *Sweden*: Oberg et al. 2002	
Females more				**NORTH AMERICA** *United States*: Dorries et al. 1989 (biological odors)	**EUROPE** *Netherlands*: Hulshoff Pol et al. 2000 (nonbiological odors) **NORTH AMERICA** *United States*: Koelega & Koster 1974 (biological odors); P Wallace et al. 1977 (body odor); Doty et al. 1982 (breath odors); Lord & Kasprzak 1989 (biological odors); Chen & Haviland-Jones 2000 (biological odors); Plateck et al. 2001 (biological odors)	

4.1.3.4. Odor Identification

Odor identification pertains to the ability to accurately name odors. As shown in Table 4.1.3.4, when sex differences exist in odor identification, they are nearly always in favor of females.

Table 4.1.3.4. Odor identification.

Nature of Any Difference					Postpubertal	Multiple Age Categories
					Adult	
Males more						
No signif. difference					**EUROPE** *Germany*: Hold & Schleidt 1977 (own body odor); Kobal et al. 2000 (nonbiological odors)	**EUROPE** *Sweden*: Larsson et al. 2000 **NORTH AMERICA** *United States*: RE Jones et al. 1995
Females more					**EUROPE** *Sweden*: Oberg et al. 2002 (nonbiological odors) **NORTH AMERICA** *United States*: Koelega & Koster 1974; WS Cain 1982 (nonbiological odors); Doty et al. 1984 (nonbiological odors); Ship & Weiffenbach 1993 (elderly, nonbiological odors); NL Segal et al. 1995 (twins, nonbiological odors); Platek et al. 2001 (own body odor, 59% vs. 6%) **INTERNATIONAL** *Multiple Countries*: Doty et al. 1985 (nonbiological odors)	**INTERNATIONAL** *Multiple Countries*: Wysocki & Gilbert 1989 (nonbiological odors)

4.1.3.5. Associating Odor with Mood

The tendency to associate specific odors with specific moods was shown by one study to be more common among females than among males (Table 4.1.3.5).

Table 4.1.3.5. Associating odor with mood.

Nature of Any Difference	Postpubertal	
	Adolescent	Adult
Males more		
No signif. difference		
Females more	**NORTH AMERICA** *United States*: Lehrner et al. 2000*	**NORTH AMERICA** *United States*: Lehrner et al. 2000*

4.1.3.6. Neurological Response to Odors

One study using magnetic resonance imaging suggested that females exhibited greater neural activation to odors than did males (Table 4.1.3.6).

Table 4.1.3.6. Neurological response to odors.

Nature of Any Difference	Postpubertal
	Adult
Males more	
No signif. difference	
Females more	**NORTH AMERICA** *United States*: Yousem et al. 1999 (MRI scan)

4.1.4. Visual Perceptions

Visual perceptions are generated by information that is gathered on the retina and transmitted to various areas of the visual cortex where it is processed to generate a perception of our visual world. Several studies have compared males and females regarding their visual sensitivity.

4.1.4.1. Visual Acuity/Sensitivity

Research on visual acuity has reached very inconsistent conclusions with respect to sex differences (Table 4.1.4.1). Many of the apparent inconsistencies may be explained by the fact that the studies measured different aspects of visual acuity.

Table 4.1.4.1. Visual acuity/sensitivity.

Nature of Any Dif-ference	Prepubertal		Postpubertal		Multiple Age Categories
	Infant	Childhood	Adolescent	Adult	
Males better	**NORTH AMERICA** *United States*: JS Watson 1969; Schweinle & Wilcox 2004		**NORTH AMERICA** *United States*: Burg & Hubert 1961* (moving & static targets); Burg 1966 (static & moving targets)	**EUROPE** *Britain*: Ross & Woodhouse 1979 **NORTH AMERICA** *United States*: EL Nichols 1885 (young); Burg & Hulbert 1961* (young); JS Roberts 1964; Burg 1966 (young); D McGuiness & Lewis 1976 (young)	
No signif. difference				**NORTH AMERICA** *United States*: Kosmidis et al. 1998 (2 stimulus discrimination tasks)	
Females better	**NORTH AMERICA** *United States*: Tighe & Powlison 1978; Creighton 1984 (4-8 month olds)	**NORTH AMERICA** *United States*: Jakobsdottir et al. 1994 (color sensitivity)		**NORTH AMERICA** *United States*: D McGuinness 1976 (see better in the dark) **PRIMATE (EXCEPT APE)** *Squirrel Monkey*: GH Jacobs 1977 **RODENT** *Rat*: RN Hughes 1999	**NORTH AMERICA** *United States*: R Engel et al. 1968 (light sensitivity)

4.1.4.2. Color Discrimination/Recognition (Naming Colors)/Color Sensitivity

Throughout the entire age spectrum, studies have revealed that females are faster, more accurate, and better at discriminating subtle differences in colors than are males (Table 4.1.4.2).

Table 4.1.4.2. Color discrimination/recognition (naming colors)/color sensitivity.

Nature of Any Difference	Prepubertal				Postpubertal	
	Infant	Toddler	Early Childhood	Childhood	Adolescent	Adult
Males more						
No signif. difference						**EUROPE** *Netherlands*: Houx et al. 1993 (Stroop test) **NORTH AMERICA** *United States*: Connor et al. 1988 (Stroop test, college); Martin & Franzen 1989 (Stroop test, college); Trenerry et al. 1989 (Stroop test); Swerdlow et al. 1995 (Stroop test)
Females more	**NORTH AMERICA** *United States*: R Staples 1932*	**NORTH AMERICA** *United States*: R Staples 1932*	**NORTH AMERICA** *United States*: Monroe 1903*	**EUROPE** *Britain*: Burt & Moore 1912 **MIDDLE EAST** *Israel*: Passig & Levin 2000 (young, color sensitivity) **NORTH AMERICA** *United States*: Monroe 1903*; Lewerenz 1928*; Ligon 1932*	**NORTH AMERICA** *United States*: Lewerenz 1928*; Ligon 1932*; J Simpson & Tarrant 1991; McFate & Orr 1949 (aware of, on Rorschach test); MR Hertz & Baker 1943 (aware of, on Rorschach test)	**EUROPE** *Sweden*: Wijk et al. 1999 (elderly) **NORTH AMERICA** *Canada*: D Kimura et al. 1996 (college); *United States*: RS Woodworth & Wells 1911 (young); PH DuBois 1939 (young); E Rich 1977 (college); Swaringen et al. 1978; LL Thomas et al. 1978 (college); Nowaczyk 1982 (college) **BIRD** *Chicken*: Vallortigara 1996

4.1.4.3. Flicker Fusion Threshold

When a strobe light is made to flicker faster and faster, eventually people perceive it as a constant shining light. This point is known as flicker fusion. All available research indicates that the point of flicker fusion is higher for males than for females (Table 4.1.4.3).

Table 4.1.4.3. Flicker fusion threshold.

Nature of Any Difference	Prepubertal				Postpubertal	
				Childhood	Adolescent	Adult
Higher for males				**NORTH AMERICA** *United States*: Hartmann 1934*; VL Miller 1942*	**NORTH AMERICA** *United States*: VL Miller 1942*	**NORTH AMERICA** *United States*: Hartmann 1934* (young); Pohl & Caldwell 1968 (young); D McGuiness & Lewis 1976 (young); Hoyenga & Wallace 1979 (young)
No signif. difference						
Higher for females						

4.1.4.4. Perceptual Speed in Visual Discrimination

Speed in visual discrimination refers to the amount of time required to accurately discriminate visual objects that differ only slightly from one another. Studies have provided somewhat mixed results regarding any gender difference in this ability, although most studies have concluded that females are quicker than males (Table 4.1.4.4). A similar conclusion was reached based on a statistical meta-analysis by Hedges and Nowell (1995).

Table 4.1.4.4. Perceptual speed in visual discrimination.

Nature of Any Difference	Prepubertal				Postpubertal	
				Childhood	Adolescent	Adult
Males faster & more accurate				**NORTH AMERICA** *United States*: Uhrbrock 1920*	**NORTH AMERICA** *United States*: Uhrbrock 1920*	**EUROPE** *Germany*: Rammstedt & Rammsayer 2002a (young, self report); Rammstedt & Rammsayer 2002b (young, self report)
No signif. difference				**NORTH AMERICA** *United States*: HL Koch 1954 (young)		**NORTH AMERICA** *United States*: Reese et al. 2001 (counting the number of A's in an experimental written text)
Females faster & more accurate				**NORTH AMERICA** *United States*: Burt & Moore 1912; Pyle 1913a*; Gates 1916b; Pyle 1924*	**NORTH AMERICA** *Canada*: Hakstian & Cattell 1975:303; *United States*: Pyle 1913a*; Woolley & Fisher 1914; Pyle 1924*; Schneidler & Paterson 1942; Wesman 1949; McGuire 1961; Dye & Very 1968 (perceptual velocity); A Feingold 1988a; RS Kennedy et al. 1996 (circularvection)	**NORTH AMERICA** *United States*: Woodworth & Wells 1911 (young); Culler 1912 (young); Calfee 1913 (young); Haggerty & Kempf 1913 (young); Husband & Miles 1927 (young); Harter 1934 (young); Hedges & Nowell 1995; Kosmidis et al. 1998 (perception acuity, 2 stimulus discrimination tasks) **OCEANIA** *New Zealand*: Darlington & Smith 1998 (circularvection)

4.1.4.5. Peripheral Vision

Peripheral vision involves the ability to see stimuli that are beyond one's focal vision. The one study located on sex differences in the width of peripheral vision concluded that it was greater for females than for males (Table 4.1.4.5).

Table 4.1.4.5. Peripheral vision.

Nature of Any Difference					Postpubertal
					Adult
Males better					
No signif. difference					
Females better					**NORTH AMERICA** *United States*: D McGuinness 1976 (wider peripheral visual field)

4.1.4.6. Responsiveness to Rorschach Test

According to a couple of studies of adolescents, boys were faster and more accurate in identifying various features of the Rorschach (or inkblot) test than were females (Table 4.1.4.6).

Table 4.1.4.6. Responsiveness to Rorschach test.

Nature of Any Dif-ference				Postpubertal	
				Adolescent	
Males faster & more accurate				**NORTH AMERICA** *United States*: MR Hertz & Baker 1943 (identifying more features); McFate & Orr 1949 (identifying more features)	
No signif. difference					
Females faster & more accurate					

4.1.4.7. Estimating Distance

The available studies have come to conflicting conclusions regarding the nature of any gender difference in estimating distances (Table 4.1.4.7).

Table 4.1.4.7. Estimating distance.

Nature of Any Difference					Postpubertal
					Adult
Males more accurate					**NORTH AMERICA** *Canada*: MG Bigel & Ellard 2000* (when walking); United *States*: Kirasic et al. 1984 (young)
No signif. difference					
Females more accurate					**NORTH AMERICA** *Canada*: MG Bigel & Ellard 2000* (when walking); *United States*: McGuiness & Sparks 1983 (young)

4.1.4.8. Visual Recognition of the Sex of Faces

The two studies that have compared the sexes with respect to their ability to recognize faces that subjects were exposed to earlier in a testing session concluded that men were better than women at recognizing the faces of both sexes; women only consistently recognized female faces (Table 4.1.4.8).

Table 4.1.4.8. Visual recognition of the sex of faces.

Nature of Any Difference					Postpubertal
					Adult
Males more accurate					**ASIA** *Japan*: Yamaguchi et al. 1995* (of the faces of both sexes) **EUROPE** *Italy*: Cellerino et al. 2004* (of the faces of both sexes)
No signif. difference					
Females more accurate					**ASIA** *Japan*: Yamaguchi et al. 1995* (of female faces) **EUROPE** *Italy*: Cellerino et al. 2004* (of female faces)

4.1.4.9. Discrimination Between Mothers and Strangers

A few studies have introduced pictures of an infant's mother and a total stranger to infants to determine if they seem to detect the difference. Table 4.1.4.9 suggests that female infants are better at performing this discrimination task than are male infants.

Table 4.1.4.9. Discrimination between mothers and strangers.

Nature of Any Difference	Infant
Males better	
No signif. difference	
Females better	**NORTH AMERICA** *United States*: Barrera & Maurer 1981; Field et al. 1984; Roe 1990

4.1.5. Internal Perceptions

Internal perceptions refer to the extent to which people tend to be aware of and/or are accurate in monitoring the condition of one or more internal organs, such as the heart or the stomach. To make these assessments, researchers usually ask subjects to report the conditions of an internal organ as they go about their daily activities or under controlled experimental conditions (Roberts & Pennebaker 1995:150).

4.1.5.1. Bodily Vigilance

Three studies sought to determine which sex was more inclined to monitor and to be aware of the state of their internal organs. As shown in Table 4.1.5.1, all of these studies concluded that females were more prone to do so than males.

Table 4.1.5.1. Bodily vigilance.

Nature of Any Difference	Postpubertal
	Adult
Males more accurate	
No signif. difference	
Females more accurate	**NORTH AMERICA** *Canada*: Robert & Longpre 2005 (proprioceptive information); *United States*: Verbrugge 1980 (college) **OCEANIA** *Philippines*: Lieban 1985

4.1.5.2. Heart Rate (Heartbeat)

As shown in Table 4.1.5.2, studies have consistently found that males are more accurate than females in reporting the rate at which their heart is beating.

Table 4.1.5.2. Heart rate (heartbeat).

Nature of Any Difference	Postpubertal	Multiple Age Categories
	Adult	
Males more accurate	**NORTH AMERICA** *United States*: Whitehead et al. 1977; GE Jones & Hollandsworth 1981; Katkin et al. 1981; GE Jones et al. 1984; Katkin 1985; GE Jones et al. 1987; Blascovich et al. 1992; Harver et al. 1993	**NORTH AMERICA** *United States*: Pennebaker & Hoover 1984
No signif. difference		
Females more accurate		

4.1.5.3. Respiration Rate

One study examined male-female differences in estimating changes in experimentally controlled changes in respiration rates. It found males to be more able to accurately estimate changes than females (Table 4.1.5.3).

Table 4.1.5.3. Respiration rate.

Nature of Any Difference					Postpubertal
					Adult
Males more accurate					**NORTH AMERICA** *United States*: Harver et al. 1993
No signif. difference					
Females more accurate					

4.1.5.4. Stomach Contraction

Limited research on gender differences in the accuracy of detecting stomach contractions has indicated that males are more accurate than females (Table 4.1.5.4).

Table 4.1.5.4. Stomach contraction.

Nature of Any Difference					Postpubertal
					Adult
Males more accurate					**NORTH AMERICA** *United States*: Whitehead & Drescher 1980
No signif. difference					
Females more accurate					

4.1.6. Other Perceptual Skills

Studies have investigated a number of other perceptual abilities in terms of possible gender differences. The results are summarized below.

4.1.6.1. Estimating Temporal Physical Events (Time Estimation Accuracy)

A few studies have sought to determine if males or females are better at accurately assessing time intervals. These studies have come to inconsistent conclusions (Table 4.1.6.1).

Table 4.1.6.1. Estimating temporal physical events (time estimation accuracy).

Nature of Any Difference				Postpubertal		Multiple Age Categories
				Adolescent	Adult	
Males more accurate				**NORTH AMERICA** *United States*: Steward 1926; Gulliksen 1927		**EUROPE** *Scotland*: McLeod & Ross 1983*
No signif. difference						
Females more accurate				**NORTH AMERICA** *United States*: Swift & McGeoch 1925	**EUROPE** *Spain*: Botella et al. 2001 (college)	

4.1.6.2. Estimating/Perceiving Environmental Hazards and Risks

Research undertaken to compare males and females in terms of their perceived risks of being injured under various circumstances have revealed significant differences. As shown in Table 4.1.6.2, females give higher average estimates of the risk of being injured from various hypothetical or real circumstances than do males.

Table 4.1.6.2. Estimating/perceiving environmental hazards and injury risks.

Nature of Any Difference	Prepubertal	Postpubertal	Multiple Age Categories
	Childhood	Adult	
Male risk estimates are higher			
No signif. difference			
Female risk estimates are higher	**NORTH AMERICA** *Canada*: Morrongiello 1997; Hillier & Morrongiello 1998; Morrongiello & Rennie 1998	**EUROPE** *Britain*: Slovic et al. 1997 (environmental risks); *Netherlands*: van den Eijnden 2000:1540 (risk from unprotected sex) **NORTH AMERICA** *Canada*: Steger & Witt 1989 (environmental hazards); *United States*: Shimp & Bearden 1982 (purchases); CJ Brody 1984 (nuclear power plant accidents); JD White & Truly 1989 (purchasing); GT Gardner & Gould 1989 (public health risks); JF Flynn et al. 1994 (health risks); Barke et al. 1997 (environmental risks); Garbarino & Strahilevity 2004 (Internet purchasing)	**EUROPE** *Netherlands*: Gutteling & Wiegman 1993 (environmental hazards) **NORTH AMERICA** *United States*: Gwartney-Gibbs & Lach 1991 (nuclear war)

4.1.6.3. Right-Left Confusion

Right-left confusion refers to the tendency to have to pause and think with respect to which is on one's right and left side. While many studies have shown women to be quicker at responding, one study in 1991 says differently. In other words, according to TJ Snyder, men are quicker to respond while women are more accurate. As for the rest of the table, women are shown to exhibit quicker responses to right-left situations (Table 4.1.6.3).

Table 4.1.6.3. Right-left confusion.

Nature of Any Difference	Prepubertal	Postpubertal	Multiple Age Categories
	Early Childhood	Adult	
Males more		**NORTH AMERICA** *United States*: TJ Snyder 1991* (respond quicker)	
No signif. difference	**NORTH AMERICA** *United States*: SG Sapir 1966:989 (same level/rate of discrimination)		
Females more		**NORTH AMERICA** *Canada*: P Bakan & Putnam 1974 (young); TJ Snyder 1991* (college); *United States*: SM Wolf 1973*; LJ Harris & Gitterman 1978* (young); Manga & Ballesteros 1987 (college); Hannay et al. 1990; McMonnies 1990*; TJ Snyder 1991* (accurate); RJ Williams et al. 1993* **EUROPE** *Norway*: Ofte 2002 (young); Ofte & Hughdahl 2002:89 (used on objective tests) **OCEANIA** *Australia*: RJ Williams et al. 1993* (college)	**NORTH AMERICA** *United States*: SM Wolf 1973*; LJ Harris & Gitterman 1978* **OCEANIA** *Australia*: McMonnies 1990*

4.2
PAIN FACTORS (EXCEPT ILLNESS-RELATED PAIN)

Many studies have compared males and females regarding their tendencies to feel and/or tolerate pain. The studies having to do with pain that one experiences in association with an illness were considered in Chapter 3. Here, the focus will be on pain that is experimentally induced for research purposes.

4.2.1. Pain Perception and Tolerance

The perception of a stimulus as being painful can be referred to as pain sensitivity, perception, or detection. An individual's pain threshold is the point at which a stimulus begins to be felt to such intensity that it is perceived as beginning to be painful.

4.2.1.1. Pain Perception/Detection/Sensitivity/Threshold in General

Numerous studies have compared the sexes regarding pain sensitivity and the like. As shown in Table 4.2.1.1, most research has found females perceive stimuli at a given intensity to be more painful than do males. This conclusion concurs with past reviews of the experimental pain literature (Fillingim & Maixner 1995; Riley et al. 1998; Keogh & Herdenfelt 2002:195).

Table 4.2.1.1. Pain perception/detection/sensitivity/threshold in general.

Nature of Any Difference	Prepubertal			Postpubertal	Multiple Age Categories
	Infant	Early Childhood	Childhood	Adult	
Detection by males sooner or at lower intensities				**ASIA** *China*: Chia et al. 2002 (post-surgery) **NORTH AMERICA** *Canada*: Dubreuil & Kohn 1986; *United States*: W Clark & J Goodman 1974 (elderly)	
No signif. difference			**EUROPE** *Sweden*: Hogeweg et al. 1996 **NORTH AMERICA** *United States*: Pothmann 1993	**EUROPE** *Britain*: J Hardy et al. 1954 **NORTH AMERICA** *United States*: Clausen & H King 1950 (young); Notermans 1966; Liberson & Liberson 1975; Neri & Agazzani 1984; Kenshalo 1986 (young); Buchelew et al. 1990 (clinical sample); F Bush et al. 1993; Coulthard et al. 1993 (young); Maixner & Humphrey 1993*; Fillingim et al. 1996; Zeichner et al. 2000 (young)	**EUROPE** *Germany*: Hoffmeister & Bellach 1995 **NORTH AMERICA** *Canada*: Lander et al. 1989; *United States*: WC Clark & Mehl 1971; J Lander et al. 1990 (clinical sample); Lautenbacher & Strian 1991; FM Bush et al. 1993 (clinical sample)
Detection by females sooner or at lower intensities	**NORTH AMERICA** *United States*: LP Lippsett & Levy 1959	**NORTH AMERICA** *United States*: Fearon et al. 1996	**NORTH AMERICA** *United States*: Savedra et al. 1982 (use emotional descriptors more); Zeltzer et al. 1989; Buskila et al. 1993	**EUROPE** *Denmark*: Ge et al. 2003; Ge et al. 2004; *Germany*: Ellermeier & W Westphal 1995 (young); *Italy*: Della Corte et al. 1965 (young); *Sweden*: Hogeweg et al. 1992 **LATIN AMERICA** *Columbia*: Cepeda & Carr 2003 (surgery patients) **NORTH AMERICA** *Canada*: Rollman & G Harris 1987 (young); MJL Sullivan et al. 2000 (young); Marchand & Arsenault 2002 (young adults); Frot et al. 2004; *United States*: Notermans & Tophoff 1967; Procacci et al. 1970 (elderly); W Clark & Mehl 1971 (elderly); K Woodrow et al. 1972; AC Coats 1974; Tedford et al. 1977; Frid et al. 1979; M Buchsbaum et al. 1981a; Buchsbaum et al. 1981b; K McCaul & Haugtvedt 1982 (young); B Jones & M Gwynn 1984; M Otto & M Dougher 1985; Dubreil & Kohn 1986 (young); Fischer 1987; Robin et al. 1987 (young); Rollman & Harris 1987 (young); Brennum et al. 1989 (young); E Hall & S Davies 1991 (young); Lautenbacher & Strian 1991; R Jensen et al. 1992*; Lautenbacher & Rollman 1993*; Maixner & Humphrey 1993* (young); Meh & Denislic 1994; Ellermeier & Westphal 1995 (young, pupilary response); NL Segal et al. 1995 (sensitive to odor); Fillingim & Maixner 1996; Ship et al. 1996 (sensitive to odor by elderly); CE Barber 1997 (more sensitive to odor); Berkley 1997; P Paulson et al. 1998 (frontal lobe activation); ME Robinson et al. 1998a (clinic sample); Fillingim et al. 2000* (young); Taenzer et al. 2000 (after ligament surgery); Sarlani & Greenspan 2002; Chesterton et al. 2003; Karibe et al. 2003 (jaw pain after chewing bubble gum for 6 minutes) **RODENT** *Rat*: WW Beatty & Beatty 1970* (young); WW Beatty & Fessler 1977a (young); WW Beatty & Fessler 1977b (young); Dubreuil & Kohn 1986 (young)	**EUROPE** *Sweden*: R Jensen et al. 1992* **NORTH AMERICA** *United States*: Schumacher et al. 1940; Petrie 1967:146; KM Woodrow et al. 1972; Procacci et al. 1974; Helkimo 1976 (patients reporting pain); Harkins & Chapman 1977; JM Mumford & Stanley 1981; Crook et al. 1984; Margolis et al. 1984 (patients reporting chronic pain); H Taylor & Curran 1985; Sternbach 1986; Von Korff et al. 1988; Feine et al. 1991; Lautenbacher & Rollman 1993*; Paulson et al. 1998; Fillingim 2000* (pain history) **RODENT** *Rat*: Pare 1969; Beatty & Beatty 1970*; HE Marks & Hobbs 1972; Mogil et al. 1993; Aloisi et al. 1994a; Aloisi et al. 1995

4.2.1.2. Perception of Pain of a Specific Type

Studies of pain perception in which the type of pain was specified are shown in Table 4.2.1.2. As in the case of perceptions of pain in general, these studies have also largely confirmed that at least among humans, females are more likely than males to perceive a stimulus as painful at a given level of intensity. Among rats, on the other hand, one type of stimuli (temperature) appears to be more often perceived as painful at a given level of intensity by males than by females.

Table 4.2.1.2. Perception of pain of a specific type.

Nature of Any Difference	Prepubertal				Postpubertal		Multiple Age Categories
	Infant				Adolescent	Adult	
Males more	**NORTH AMERICA** *United States*: L Lippsett & Levy 1959 (electrodermal, neonate)				**NORTH AMERICA** *United States*: Buchanan & Midgley 1987 (pressure algometer)	**NORTH AMERICA** *Canada*: Lautenbacher & Rollman 1993 (heat); *United States*: M al‘Absi et al. 2004 (temperature)	**RODENT** *Rat*: Forman et al. 1989 (heat); Islam et al. 1993 (heat); Bartok & Craft 1997 (heat); Wala et al. 2001:481 (heat)
No signif. difference						**NORTH AMERICA** *Canada*: Lautenbacher & Rollman 1993* (temperature); *United States*: Hardy et al. 1954 (temperature); W Clark & Mehl 1971 (temperature); Harkins & Chapman 1977 (electrical); J Hordinsky et al. 1981 (lower body tolerance to negative pressure); Kenshalo 1986 (temperature); Lautenbacher & Strian 1991 (temperature); Lightfoot & Tsintgiras 1995 (lower body tolerance to negative pressure); Sarlani & Greenpan 2002* (painful stimuli)	**NORTH AMERICA** *United States*: Neri & Agazzani 1984
Females more						**NORTH AMERICA** *Canada*: Lautenbacher & Rollman 1993* (electrical); *United States*: Procacci et al. 1970 (temperature); Westcott et al. 1977 (temperature); Goolkasion 1980; Rollman & Harris 1984 (electrical); M Otto & Dougher 1985 (pressure & temperature); Dubreil & Kohn 1986 (pressure); H Buchanan & J Midgley 1987 (young, experimental conditions); A Fischer 1987 (pressure); Rollman & Harris 1987 (young, electrical); Arendt-Nielsen & Bjerring 1988 (experimental conditions); Lipman et al. 1990 (temperature); Rollman et al. 1990 (electrical); Feine et al. 1991 (experimental heat); Levine & De Simone 1991 (young, temperature); Fillingim & Maixner 1995 (experimental); F Wolfe et al. 1995 (experimental); Unruh 1996 (clinical pain); Fillingim et al. 1998 (noxious heat); JS Walker & Carmody 1998 (experimental conditions); al’Absi et al. 1999 (cold pressure); RR Edwards et al. 1999 (noxious heat); Fillingim et al. 1999 (experimental); Sarlani & Greenpan 2002* (repeated painful stimuli); M al‘Absi et al. 2004 (hot or cold painful stimuli); Fillingim et al. 2005 (experimental heat and pressure) **RODENT** *Rat*: Beatty & Beatty 1970 (electrical at lower intensities); H Marks & Hobbes 1972 (electrical at lower intensities); H Davis et al. 1976 (electrical at lower intensities)	**NORTH AMERICA** *United States*: K Woodrow et al. 1972 (pressure); Fischer 1987 (pressure); Arendt-Nielsen & Bjerring 1988 (laser); Brennum et al. 1989 (pressure on fingers and toes); Feine et al. 1991(heat stimuli); R Jensen et al. 1992 (pressure); Fillingim 2000 (experimental) **RODENT** *Rat*: Pare 1969 (electrical at lower intensities)

4.2.1.3. Pain Tolerance

Unlike pain detection or pain threshold, pain tolerance has to do with how much pain a subject will endure. A widely used experimental test of pain tolerance is known as the cold-pressor task (or cold water emersion test; Fanurik et al. 1993). In most versions of this test, human subjects strap their arm to a lever that can be tilted downward into a container of near-freezing water. They are instructed to hold their arm down in the water until the pain is too intense to bear any longer. Other pain tolerance tests used with humans are ones in which subjects are asked to endure electrical current or physical pressure (neither of which cause any lasting harm).

In the case of laboratory animals, the most frequently used paradigm for measuring pain tolerance involves cages with two chambers, one of which has an unpleasant voltage of electrical current running through the wire grid on the cage floor. It is in this chamber that the animal’s food is located. After being deprived of food for a few hours, animals are allowed to enter the chamber in which the food is located if they choose to do so. These studies generally indicate that males remain in the chamber with the electric current longer than do females.

In the case of humans, nearly all studies have concluded that males are more tolerant of pain at a given intensity level than are females (Table 4.2.1.3). This conclusion has been reached by other literature reviews (Goolkasian 1985; Lautenbacker & Rollman 1993). In the case of laboratory animals, the evidence has been somewhat mixed although in the same general direction.

Table 4.2.1.3. Pain tolerance.

Nature of Any Difference	Prepubertal				Postpubertal		Multiple Age Categories
				Childhood		Adult	
Males tolerate more						**EUROPE** *Britain*: E Keogh & Herdenfeldt 2002 (experimental); *Sweden*: Harju 2002:70* (elderly, in the upper arms) **NORTH AMERICA** *Canada*: Rollman 1983 (experimental pain); Buchenan & Midgley 1987 (pressure); Feine et al. 1991 (heat); Lautenbacher & Rollman 1993* (electrocutaneous stimuli); *United States*: Josey & Miller 1932; WC Clark & Goodman 1974; Buchsbaum et al. 1981; M Otto & Dougher 1985 (young); O Robin et al. 1987 (young); Rollman & Harris 1987 (young); Arendt-Nelson & Bjerring 1988 (laser stimuli); Maixner & Humphrey 1993; TR Hogan et al. 1995 (of lower body negative pressure); VA Convertino 1998 (of lower body negative pressure); JS Walker & Carmody 1998 (experimental); CR France & Suchowiecki 1999 (experimental) **RODENT** *Rat*: Beatty & Beatty 1970; HE Marks & Hobbs 1972; WW Beatty & Fessler 1977a (young); WW Beatty & Fessler 1977b; Baamondde et al. 1989; Steenbergen et al. 1991; Aloisi et al. 1994a; Aloisi 1997; AC Barrett et al. 2002 (mechanical pressure test with hindpaw)	**EUROPE** *Germany*: Brahler 1984 **NORTH AMERICA** *United States*: BB Wolff et al. 1969 (experimental); KM Woodrow et al. 1972:555; Otto & Dougher 1985; Meh & Denislic 1994 **RODENT** *Rat*: J Archer 1975; Bodnar et al. 1988
No signif. difference				**NORTH AMERICA** *United States*: Tsao et al. 2002:219		**NORTH AMERICA** *Canada*: Lautenbacher & Rollman 1993* (heat pain applied to hands & feet); *United States*: WC Clark & Goodman 1974 (young); Lawlis et al. 1984 (patients with chronic pain); Fillingim et al. 1996	**NORTH AMERICA** *United States*: Maixner & Humphrey 1993 **RODENT** *Rat*: Mogil et al. 1993
Females tolerate more						**EUROPE** *Sweden*: Harju 2002:70* (elderly, at the knee)	**RODENT** *Rat*: Baamaonde et al. 1989

4.2.1.4. Physiological Responses to Pain

Pain produces various physiological responses. Table 4.2.1.4 shows that studies have reached contradictory conclusions regarding sex differences in blood pressure and heart rate responses to pain.

Table 4.2.1.4. Physiological responses to pain.

Nature of Any Difference					Postpubertal		
						Adult	
Males more						**NORTH AMERICA** *United States*: Maixner & Humphrey 1993* (increased blood pressure); Dixon et al. 2004* (college, increased heart rate)	
No signif. difference							
Females more						**NORTH AMERICA** *United States*: Maixner & Humphrey 1993* (increased heart rate); Dixon et al. 2004* (college, increased blood pressure)	

4.2.2. Other Aspects of Pain

Studies have examined a variety of pain-related responses, the results of which are summarized in the following tables.

4.2.2.1. Catastrophizing Over Pain

Catastrophizing over pain refers to the tendency to focus on and even exaggerate the pain one is experiencing and its potential consequences. Some studies have recorded the amount of exaggeration of pain while another seeks to determine gender differences in pain prediction. This study shows that men predict a more severe antecedent of pain from surgery. Most of the limited research on this phenomenon suggests that exaggerating current pain is more common among females than among males (Table 4.2.2.1).

Table 4.2.2.1. Catastrophizing over pain.

Nature of Any Difference					Postpubertal	Multiple Age Categories
					Adult	
Males more					**EUROPE** *Poland*: Eli et al. 2000 (pre-operatively) **NORTH AMERICA** *United States*: Osman et al. 1997	
No signif. difference						
Females more					**NORTH AMERICA** *Canada*: MJL Sullivan et al. 2000 (young); JA Ellis & D'Eon 2002; D'Eon et al. 2004 (college); *United States*: Sullivan et al. 1995; Keefe et al. 2000 (osteoarthritis patients); Osman et al. 2000; Sullivan et al. 2000; M Sullivan et al. 2001	**NORTH AMERICA** *Canada*: MJL Sullivan et al. 1995; *United States*: I Jensen et al. 1994; Osman et al. 1997

4.2.2.2. The "Placebo Effect" Regarding Pain Tolerance

As it relates to pain tolerance, the "placebo effect" involves administering supposed "medication" or some other therapy to a subject that is actually inert as a way of relieving or lessoning his/her pain. Two studies indicate that the "placebo effect" had greater effects on male subjects than on female subjects (Table 4.2.2.2).

Table 4.2.2.2. The "placebo effect" regarding pain tolerance.

Nature of Any Difference					Postpubertal	
					Adult	
Males more susceptible					**NORTH AMERICA** *United States*: Aletky & Carlin 1975 (college, "muscle fatigue" cream); Compton et al. 2003 (cold pressure pain)	
No signif. difference						
Females more susceptible						

4.3

MOTOR SKILL FACTORS

Numerous studies have investigated gender differences in a variety of simple reflexes and motor movements. Findings are summarized in the following section.

4.3.1. Basic Reflexes and Repetitive Motor Movements

Findings concerning sex differences in some of the most basic and involuntary types of reflexes are discussed in the following sub-section.

4.3.1.1. Body Twitching and Jerking

As shown in Table 4.3.1.1, a couple of studies of infants have concluded that boys twitch and jerk more than do girls.

Table 4.3.1.1. Body twitching and jerking.

Nature of Any Difference	Prepubertal					
	Infant					
Males more	**NORTH AMERICA** *United States*: Gatewood & Weiss 1930; J Bernard 1964 (in utero)					
No signif. difference						
Females more						

4.3.1.2. Chronic Hair Pulling/Hair Twisting

Two studies of gender differences in persistent hair pulling or twisting have both indicated that this behavior is more characteristics of females than of males (Table 4.3.1.2).

Table 4.3.1.2. Chronic/persistent hair pulling/hair twisting.

Nature of Any Difference	Prepubertal	Multiple Age Categories
	Toddler	
Males more		
No signif. difference		
Females more	**NORTH AMERICA** *United States*: Hattwick 1937 (hair twisting)	**NORTH AMERICA** *United States*: GA Christenson et al. 1991 (hair pulling)

4.3.1.3. Eye Blink (or Eyelid) Startle Response

The eyelids tend to twitch shut when an individual is suddenly startled. This momentary twitching can be measured with electrodes placed just beneath each eye (Rahman et al. 2003). The available research has indicated that the eye blink startle response is more pronounced in females than in males (Table 4.3.1.3).

Table 4.3.1.3. Eye blink (or eyelid) startle response.

Nature of Any Difference	Postpubertal
	Adult
Males more	
No signif. difference	
Females more	**EUROPE** *Britain*: Rahman et al. 2003 **NORTH AMERICA** *United States*: KW Spence & Spence1966 (exhibit eyelid conditioning)

4.3.1.4. Orgasm/Copulatory Reflex

A limited amount of research on the intensity of the orgasm reflex suggests that it is greater in males than in females, both for humans and for rats (Table 4.3.1.4).

Table 4.3.1.4. Orgasm/copulatory reflex.

Nature of Any Difference	Postpubertal	Multiple Age Categories
	Adult	
Greater in males	**NORTH AMERICA** *United States*: Chivers & Bailey 2005:116 (during sexual intercourse)	**RODENT** *Rat*: B Hart 1980; Sachs 1981
No significant difference		
Greater in females		

4.3.1.5. Startle Response (Startling Behavior)

Studies concerning gender differences in exhibiting a startle response (such as when one is being suddenly awoken) are inconclusive in adult humans and rodents. However, in young humans and rodents males exhibit stronger startle response than do females (Table 4.3.1.5).

Table 4.3.1.5. Startle response (startling behavior).

Nature of Any Difference	Prepubertal		Postpubertal	
	Neonate	Toddler	Adolescent	Adult
Males more	**NORTH AMERICA** *United States*: Feldman et al. 1977	**NORTH AMERICA** *United States*: Korner 1969:1047 (when asleep)	**RODENT** *Rat*: Blaszczyk & Tajchert 1996 (acoustic)	**EUROPE** *Britain*: Rahman et al. 2003 (prepulse inhibition of startle response) **NORTH AMERICA** *United States*: Swerdlow et al. 1993 (prepulse inhibition of startle response); Mahaffey et al. 2005 **RODENT** *Rat*: Faraday et al. 1999 (startled by weaker prepulses); J Lehmann et al. 1999 (when paired with prepulse)
No signif. difference				**EUROPE** *Switzerland*: K Ludewig et al. 2003 (acoustic startle response) **RODENT** *Mice*: *Rat*: M Koch 1998 (prepules inhibition of acoustic startle response)
Females more				**NORTH AMERICA** *United States*: Bradley et al. 2001 (response to aversive stimuli); Kofler et al. 2001 (stronger response)

4.3.1.6. Rearing/Vertical Behavior

The tendency to rear by rodents has been studied under various conditions. Table 4.3.1.6 suggests that no generalization is warranted with respect to any sex difference in this type of behavior.

Table 4.3.1.6. Rearing/vertical behavior.

Nature of Any Difference		Postpubertal
	Infant	Adult
Males more		**RODENT** *Rat*: Vathy et al. 1993 (vertical, in open field); JA Osborn et al. 1998 (rearing, open field)
No signif. difference		
Females more	**RODENT** *Rat*: MM Clark et al. 1993 (neonates, stand with one forepaw)	**RODENT** *Rat*: JA Gray et al. 1965 (in an open field);

4.3.2. Motor Coordination Factors

Motor coordination has to do with one's ability to execute muscular movements in ways that accomplish one's intended tasks. A wide range of motor coordination skills have been investigated with respect to gender differences.

4.3.2.1. Overall Motor Coordination/Development

Studies that have assessed gender differences in motor coordination and development of various types have come to inconsistent conclusions (Table 4.3.2.1). Most of the seeming inconsistencies may be explainable in terms of the exact types of motor skills investigated.

Table 4.3.2.1. Overall motor coordination/development.

Nature of Any Difference	Prepubertal				Postpubertal	
	Infant	Toddler	Early Childhood	Childhood	Adolescent	Adult
Males greater	**NORTH AMERICA** *United States*: R Bell & Darling 1965 (head lifting); Reinisch et al. 1991:24 (head lifting & crawling)		**NORTH AMERICA** *United States*: SG Sapir 1966:989 (visual motor skills: accurately copying shapes)	**NORTH AMERICA** *United States*: Burt & Moore 1912; Wallin 1916*; Langhorne1933a	**NORTH AMERICA** *United States*: Wallin 1916*; Langhorne 1933a; Espenschade 1940	**EUROPE** *Sweden*: Scott et al. 2000 (writing, speech, fumbling, gait disturbances, saliva flow among Parkinson's patients, elderly) **LATIN AMERICA** *Brazil*: SL Schmidt et al. 2000 (young) **NORTH AMERICA** *United States*: GB Johnson 1932 (young, walking a tightrope); Joseph & Willingham 2000 (type of motor skill: inverted tracking task)
No signif. difference		**NORTH AMERICA** *United States*: N Bayley 1965 (motor skills)	**NORTH AMERICA** *United States*: Wallin 1916*			**MIDDLE EAST** *Israel*: Lieberman & Lieberman 2004 (elderly, functional independence prior to suffering a hip fracture) **NORTH AMERICA** *United States*: Husband & Ludden 1931 (young)
Females greater		**NORTH AMERICA** *United States*: Kagan & Lewis 1965; Ingram 1975 (accurately copy hand postures)	**NORTH AMERICA** *United States*: Sapir 1966	**NORTH AMERICA** *United States*: Bentzen 1963		**NORTH AMERICA** *United States*: PT Young 1931 (young) **RODENT** *Rat*: RA Cohn et al. 1972; Tseng & Craft 2001

4.3.2.2. Rate of Maturation in Motor Development

The two studies of maturation rates in motor development came to inconsistent conclusions regarding possible sex differences (Table 4.3.2.2).

Table 4.3.2.2. Rate of maturation in motor development.

Nature of Any Difference	Prepubertal	Multiple Age Categories
	Infant	
Males more	**EUROPE** *Sweden*: Reinisch et al. 1991 (lifting head while on stomach, standing with support & crawling)	
No signif. difference		
Females more		**NORTH AMERICA** *United States*: Kochanska et al. 1996

4.3.2.3. Age-Related Decline in Motor Skills

One study of age-related decline in motor skills among monkeys concluded that it was greater for males than for females (Table 4.3.2.3).

Table 4.3.2.3. Age-related decline in motor skills.

Nature of Any Difference							Multiple Age Categories
Males larger							**PRIMATE (EXCEPT APE)** *Rhesus Macaque*: A Lacreuse et al. 2005
No signif. difference							
Females larger							

4.3.2.4. Athletic Performance in General

Using a variety of methodologies, a number of studies have sought evidence of gender differences in athletic performance and/or ability. These studies have all given the edge to males over females, including one study of horses (Table 4.3.2.4).

Table 4.3.2.4. Athletic performance in general.

Nature of Any Difference					Postpubertal		Multiple Age Categories
					Adolescent	Adult	
Males better					**NORTH AMERICA** *United States*: Weisfeld et al. 1982 (dodge ball); Eccles et al. 1989 (self-rated) **OCEANIA** *Australia*: Fletcher & Hattie 2005:663 (self-rated)	**INTERNATIONAL** *Multiple Countries*: Arellano et al. 1994 (swim faster Olympic Games); Chengalur & Brown 1992 (200 meter Olympic swimmers); P Kennedy et al. 1990 (100 meter Olympic swimmers)	**EUROPE** *Germany*: Cehak 1940 **NORTH AMERICA** *United States*: Laird 1936 **UNGULATE** *Horse*: Stone 1935
No signif. difference							
Females better							

4.3.2.5. Body Flexibility

According to a couple of studies, females exhibit greater flexion and flexibility than do males (Table 4.3.2.5).

Table 4.3.2.5. Body flexibility.

Nature of Any Difference					Postpubertal		
					Adolescent	Adult	
Males more							
No signif. difference							
Females more					**OCEANIA** *Australia*: Fletcher & Hattie 2005:662 (self-report)	**NORTH AMERICA** *United States*: Kerrigan et al. 1998 (knee & hip flexion movement in walking)	

4.3.2.6. Hovering

One study of hovering among hummingbirds concluded that females tended to hover longer than did males (Table 4.3.2.6).

Table 4.3.2.6. Hovering.

Nature of Any Difference						Postpubertal	
						Adult	
Males hover longer							
No signif. difference							
Females hover longer						**BIRDS** *Hummingbird*: P Chai et al. 1996	

4.3.2.7. Motor Vehicle Driving Skills

The skills with which one drives motor vehicles has been investigated to a limited extent. The research has concluded that males drive in a more skillful manner than do females (Table 4.3.2.7).

Table 4.3.2.7. Motor vehicle driving skills.

Nature of Any Difference					Postpubertal	
						Adult
Males better						**NORTH AMERICA** *United States*: Heimstra et al. 1967 (young)
No signif. difference						
Females better						

4.3.2.8. Maintaining Balance/Posture

Most studies have concluded that males are better able to maintain their balance or upright posture than are females (Table 4.3.2.8).

Table 4.3.2.8. Maintaining Balance/Posture.

Nature of Any Difference					Postpubertal	
						Adult
Males better						**NORTH AMERICA** *United States*: Wolfson et al. 1994* (elderly, visual stimuli and platform are perturbed); Wolfson et al. 1994* (when asked to lift toes and balance on heels)
No signif. difference						**NORTH AMERICA** *United States*: Wolfson et al. 1994* (elderly, maintain posture while balancing)
Females better						

4.3.2.9. Manual/Digital Dexterity/Fine Motor Skills (Except Pegboard Test)

Manual dexterity has to do with movement of the hands and typically involved performing delicate movements of the fingers such as in sewing, knitting, and typing. Studies of gender differences in manual or digital dexterity have reached inconsistent conclusions, although the majority of studies have found females to be better than males at tasks requiring complex fine motor movement (Table 4.3.2.9).

Table 4.3.2.9. Manual/digital dexterity/fine motor skills (except Pegboard Test).

Nature of Any Difference	Prepubertal				Postpubertal	
	Infant		Early Childhood	Childhood	Adolescent	Adult
Males better			**NORTH AMERICA** *United States*: Langhorne 1933a*; Clinton 1930; Burt & Moore 1912	**NORTH AMERICA** *United States*: Woolley & Fisher 1914*; Wallin 1916*; Langhorne 1933a*	**NORTH AMERICA** *United States*: GB Johnson 1932	**NORTH AMERICA** *Canada*: Nicholson & Kimura 1996 (faster at single movement tasks)
No signif. difference			**NORTH AMERICA** *United States*: Wallin 1916*		**NORTH AMERICA** *United States*: Husband & Ludden 1931; Janowsky et al. 1998 (fine motor performance)	**NORTH AMERICA** *Canada*: Joseph & Willingham 2000 (pursuit performance using a joystick)
Females better	**NORTH AMERICA** *United States*: Goldberg & Lewis 1969		**NORTH AMERICA** *Canada*: Ingram 1975 (reproducing finger configuration); *United States*: Clark et al. 1969; Prior et al. 1993 (preschool)	**EUROPE** *France*: Nalcacy et al. 2001; *Germany*: Cohn & Dieffenbacher 1911; *Greece*: Natsopoulos et al. 1998; *Netherlands*: Blote & Van Gool 1989 (penmanship/hadwriting); Blote & van Haasteren 1989 (drawing) **NORTH AMERICA** *United States*: Gesell et al. 1940; McNemar & Stone 1932; Denckla 1974 (touching each finger in succession against the thumb); Rudel et al. 1984 (touching each finger in succession against the thumb)	**EUROPE** *Britain*: R Lynn 1992* (aptitude tests) **NORTH AMERICA** *United States*: Clinton 1930; Woolley & Fisher 1914; Schneidler & Paterson 1942; R Lynn 1992* (aptitude tests) **OCEANIA** *Australia*: Fletcher & Hattie 2005:663 (self-rated)	**NORTH AMERICA** *Canada*: Kimura & Vanderwolf 1970 (college, control over digital musculature); Gouchie & Kimura 1991 (college, matching, & coding); *United States*: Calfee 1913; Tiffin & Asher 1948; O'Boyle & Hoff 1987 (mirror tracing)

4.3.2.10. Fine Motor Skills Using the Pegboard Test

The pegboard (or Purdue pegboard) test is a widely used test for measuring manual dexterity. As shown in Table 4.3.2.10, nearly all studies have concluded that females perform better (i.e., faster and more accurately) than do males on this test.

Table 4.3.2.10. Fine motor skills using the pegboard test.

Nature of Any Difference	Prepubertal	Postpubertal	
	Childhood	Adolescent	Adult
More males			
No signif. difference			**NORTH AMERICA** *Canada*: Peters et al. 1990 (college)
More females	**EUROPE** *France*: Dellatolas et al. 2003:323 (young, computerized peg-moving task)	**NORTH AMERICA** *United States*: Ruff & Parker 1993*	**NORTH AMERICA** *Canada*: Bornstein 1985; Peters et al. 1990 (college); JA Hall & Kimura 1995* (college); *United States*: Polubinski & Melamed 1986 (college); Ryan et al. 1987; Thompson et al. 1987; Hampson & Kimura 1988 (college); Hampson 1990 (college); Heaton et al. 1991; Ruff & Parker 1993*; JA Hall & Kimura 1995*; G Sanders & Wright 1997 (both single & assembly peg condition); Epting & Overman 1998:1310 (college)

4.3.2.11. Motor Development Abnormalities

Research pertaining to abnormalities in the development of motor movements has concluded it is more common for boys than for girls (Table 4.3.2.11).

Table 4.3.2.11. Motor development abnormalities.

Nature of Any Difference	Prepubertal
	Early Childhood
Males more	**NORTH AMERICA** *United States*: Braine et al. 1966; JS Singer et al. 1968
No signif. difference	
Females more	

4.3.2.12. Finger Tapping Test Performance

The ability to tap one's fingers in a particular sequence and speed has been investigated for gender differences in a few studies with most studies concluding that males perform better than females on most aspects of these tests (Table 4.3.2.12).

Table 4.3.2.12. Finger tapping test performance.

Nature of Any Difference	Prepubertal	Postpubertal	Mulitple Ages
	Childhood	Adult	
Males better		**NORTH AMERICA** *Canada*: King et al. 1981 (brain damage patients); Bornstein 1985 (ages 20-69); K Nicholson & Kimura 1996 (college); Epting & Overman 1998:1310 (college, tap more times per 10 seconds when heal of hands rest on table); *United States*: Hoffman 1969; Dodrill 1979; Morrison et al. 1979 (college); Echternacht 1981 (ages 19-64, psychiatric patients); Harris et al. 1981 (college); Trautt et al. 1983 (college); Filskov & Catanese 1986; Heaton et al. 1991; McKeever & Abramson 1991	**NORTH AMERICA** *Canada*: Fromm-Auch & Yeudall 1983 (ages 15-64); *United States*: Ruff & Parker 1993 (ages 16-70)
No signif. difference		**EUROPE** *Britain*: G Sanders & Wright 1997 (speed) **LATIN AMERICA** *Brazil*: SL Schmidt et al. 2000 (young)	
Females better	**NORTH AMERICA** *United States*: Denckla 1973	**NORTH AMERICA** *Canada*: Lomas & Kimura 1976 (tapping telegraph keys in succession); *United States*: KG Nicholson & Kimura 1996 (college, sequenced hand movements)	

4.3.2.13. Penmanship

The penmanship or handwriting ability of females has been consistently judged to be better than that for males (Table 4.3.2.13).

Table 4.3.2.13. Penmanship.

Nature of Any Difference	Postpubertal	
	Adolescent	Adult
Males better		
No signif. difference		
Females better	**NORTH AMERICA** *United States*: Breland et al. 1994	**NORTH AMERICA** *United States*: PT Young 1931 (young); Stalnaker 1941 (young)

4.3.2.14. Targeting and Throwing Accuracy (Including Ball Throwing)

Many studies have examined gender differences in projectile throwing accuracy. As shown in Table 4.3.2.14, nearly all studies have found males to be more accurate than females, with the greatest male advantages appearing after the onset of puberty.

Table 4.3.2.14. Targeting and throwing accuracy (including ball throwing).

Nature of Any Difference	Prepubertal		Postpubertal		Multiple Age Categories
	Early Childhood	Childhood	Adolescent	Adult	
Males more accurate	**NORTH AMERICA** *United States*: Goodenough & Brian 1929; Gesell et al. 1940:85*	**NORTH AMERICA** *United States*: Langhorne 1933*; Gesell et al. 1940:85*	**NORTH AMERICA** *United States*: Langhorne 1933*	**EUROPE** *Britain*: Kolakowski & Malina 1974; Ross & Woodhouse 1979; Mayes et al. 1988 (estimating effects of gravity on projectile trajectories) **NORTH AMERICA** *Canada*: NV Watson & Kimura 1989 (darts); NV Watson & Kimura 1991 (college, dart throwing); JA Hall & Kimura 1995 (college); *United States*: Burg 1966 (young); Jardine & Martin 1983; Poduska & Phillips 1986; Peters 1997; Janowsky et al. 1998 (darts)	**NORTH AMERICA** *United States*: Westergaard et al. 2000
No signif. difference	**NORTH AMERICA** *United States*: Singer et al. 1968			**EUROPE** *Britain*: G Sanders & Wright 1997 (target throwing)	**PRIMATE (EXCEPT APE)** *Capuchin Monkey*: Westergaard et al. 2000
Females more accurate					

4.3.2.15. Walking, Style of

One study reported that males were more likely than females to fully extend the knee before making foot-to-floor contact (Table 4.3.2.15).

Table 4.3.2.15. Walking, style of.

Nature of Any Difference	Postpubertal
	Adult
Males more	**NORTH AMERICA** *United States*: Kerrigan et al. 1998 (knee extension before initial floor contact)
No signif. difference	
Females more	

4.3.2.16. Walking, Age of Onset

The limited research pertaining to the age at which males and females first begin to walk has either concluded that males do so earlier or that there is no significant gender difference (Table 4.3.2.16).

Table 4.3.2.16. Walking, age of onset.

Nature of Any Difference	Citation
Males earlier	**NORTH AMERICA** *United States*: Gesell et al. 1940
No significant difference	**EUROPE** *Sweden*: Reinisch et al. 1991:24
Females earlier	

4.3.3. Sidedness

Sidedness has to do with which side of the body one uses most often to perform various tasks. The most widely recognized and researched aspect of sidedness is handedness.

4.3.3.1. Handedness/Pawedness

Many studies have sought to determine if handedness varies by sex. The results of these investigations can be described in terms of the proportion of each sex that is nonright-handed with respect to tasks that are normally performed by one or the other hand (e.g., writing, brushing one's teeth, throwing a ball).

As shown in Table 4.3.3.1, most studies indicate that males are more likely to be nonright-handed (i.e., left-handed or ambidextrous) than are females. Nevertheless, a number of studies have failed to find a statistically significant difference, suggesting that the extent of any gender difference is small. Interestingly, most studies of handedness/pawedness in several nonhuman species suggest a slightly greater nonright-handed bias among males relative to females.

Table 4.3.3.1. Handedness/pawedness.

Nature of Any Difference	Prepubertal				Postpubertal		Multiple Age Categories
	Infant	Toddler		Childhood	Adolescent	Adult	
Males more non-right	**MIDDLE EAST** *Turkey*: Tan et al. 1992 (grip strength)	**NORTH AMERICA** *Canada*: DE Humphrey & Humphrey 1987		**EUROPE** *Britain*: MM Clark 1957*; Pringle et al. 1966; Annett 1983:24; Annett & Kilshaw 1983; *Germany*: M Peters 1986; *Norway*: Hugdahl et al. 1990* (young) **LATIN AMERICA** *Brazil*: Cosenza & Mingoti 1993 (young) **NORTH AMERICA** *Canada*: Bryden et al. 1991; *United States*: Denckla 1973; Hardyck et al. 1975*; Hardyck et al. 1976* (young); Ryman et al. 1984; Oundsted et al. 1985 (young)	**ASIA** *China*: Teng et al. 1976 **EUROPE** *Britain*: Annett 1970; Annett 1972*; Kilshaw & Annett 1983 **NORTH AMERICA** *Canada*: Archer et al. 1988; *United States*: Carrothers 1947; Calnan & Richardson 1976 (young); Hardyck et al. 1976; J Sherman 1979a; Benbow 1986:721	**ASIA** *Hong Kong*: JL Dawson 1977:431 (young) **EUROPE** *Britain*: Oldfield 1971 (young, college); Annett 1972* (young); Davis & Annett 1994 (young); *Norway*: Gotestam 1990b (young); Hugdahl et al. 1990* (young); *Sweden*: Levander & Schalling 1988 (young) **LATIN AMERICA** *Brazil*: Brito et al. 1985; Brito et al. 1989* (young); Cosenza & Mingoti 1993 (young) **NORTH AMERICA** *Canada*: Bryden 1977 (young); Elias et al. 1996:126 (young); *United States*: Crovitz & Zener 1962 (young); Hardyck et al. 1976* (young); MP Bryden 1977 (young); RS Dean 1982 (young); Plato et al. 1984 (young); Oundsted et al. 1985 (young); Chapman & Chapman 1987 (young); Schachter et al. 1986:275; Lansky et al. 1988; CJ Fry 1990:424* (young); C Seltzer et al. 1990:162 (young, reaching); Reio et al. 2004:348 **CANINE** *Dog*: DL Wells 2003 (forepaws); A Quaranta et al. 2004 (forepaws) **PRIMATE (EXCEPT APE)** *Gibbon*: DK Stafford et al. 1990 (reaching & brachiation); *Rhesus Macaque*: Westergaard & Lussier 1999	**ASIA** *Japan*: Maehara et al. 1988 **EUROPE** *Britain*: MM Clark 1957*; Annett 1970a; Oldfield 1971*; A Davis & Annett 1994:108; *Norway*: Tambs et al. 1987; *Scotland*: Oldfield 1971:108*; *Switzerland*: Galobardes et al. 2001 **MIDDLE EAST** *India*: Dromamraju 1975; *Turkey*: Tan 1988 **NORTH AMERICA** *Canada*: Saucier & Elias 2001 (gestures); *United States*: Enstrom 1962*; Hardyck et al. 1975*; AL Thompson & Marsh 1976; Lansky et al. 1988:468; SJ Ellis et al. 1988; AN Gilbert & Wysocki 1992; Stellman et al. 1997:168; L Ellis & Engh 2000 **INTERNATIONAL** *Multiple Countries*: Medland et al. 2004 **APE** *Chimpanzee*: WD Hopkins 1995 **FELINE** *Domesticus*: Tan et al. 1990 (reaching) **PRIMATE (EXCEPT APE)** *Lemur*: Milliken et al. 1989 (reaching); JP Ward et al. 1990 (reaching)
No signif. difference				**ASIA** *Japan*: Komai & Fukuoka 1934 **EUROPE** *Britain*: Annett 1967 (young); SM Williams 1991 (young); *Slovakia*: Ostatnikova et al. 2002:7 **NORTH AMERICA** *United States*: Enstrom 1962*; Nachshon & Denno 1986:573 (African American)		**ASIA** *China*: RS Dean et al. 1987:587 (young); *Japan*: Hatta & Kawakami 1995 (young) **EUROPE** *Britain*: Annett 1967 (young); SM Williams 1991 (young); *Sweden*: Levander & Schalling 1988 (young) **LATIN AMERICA** *Brazil*: Brito et al. 1989* **MIDDLE EAST** *Israel*: Silverberg et al. 1979 (young) **NORTH AMERICA** *Canada*: Coren & Porac 1978 (young); *United States*: Briggs & Nebes 1975 (college); B Jones & Bell 1980 (young); Ashton 1982 (college); CJ Fry 1990:424*; G Ross et al. 1992 (young) **PRIMATE (EXCEPT APE)** *Capuchin Monkey*: Masataka 1990; Westergaard 1991; Westergaard & Suomi 1993	**EUROPE** *Poland*: Herman-Jeglinska et al. 1997:179 **LATIN AMERICA** *Columbia*: Ardila et al. 1989:895 **NORTH AMERICA** *United States*: Falek 1959 **PRIMATE (EXCEPT APE)** *Rhesus Macaque*: Westergaard et al. 1998
Females more non-right						**APE** *Chimpanzee*: Boesch 1990	

4.3.3.2. Earedness, Eyedness, Facedness, and Mouthedness

A sidedness bias is not unique to the hands. Most people also exhibit sidedness preferences regarding a number of other parts of the body. Table 4.3.3.2 indicates that no discernable overall sex differences in these sidedness tendencies have been uncovered.

Table 4.3.3.2. Earedness, eyedness, facedness, footedness, and mouthedness.

Nature of Any Difference	Prepubertal				Postpubertal		Multiple Age Categories
	Infant					Adult	
Males more non-right	**NORTH AMERICA** *United States*: Gratton et al. 1992 (footedness left leg reflexes) **RODENT** *Gerbil*: MM Clark et al. 1993 (left eye opens before right eye, opposite for females)					**EUROPE** *Britain*: Hardie et al. 2005 (college) **NORTH AMERICA** *United States*: Alford & Alford 1981:605 (young, facedness when expressing emotions); Smith 2000 (college)	**NORTH AMERICA** *United States*: ME Wolf & Goodale 1987 (degree of lip separation during speech)
No signif. difference						**NORTH AMERICA** *United States*: Farkas & Cheung 1981 (facial asymmetry)	**NORTH AMERICA** *Canada*: Shaner et al. 2000 (facial asymmetry, ages 1-18)
Females more non-right						**ASIA** *Taiwan*: Liu et al. 2004 (schizophrenic patients, left eye dominance) **EUROPE** *Britain*: Oddy & Lobstein 1972 (schizophrenic patients, left eye dominance) **NORTH AMERICA** *United States*: Kannan & Lipscomb 1974 (young, earedness)	**EUROPE** *Germany*: Hausmann et al. 1998 (degree of lip separation during speech) **NORTH AMERICA** *United States*: R Graves et al. 1982 (degree of lip separation during speech)

4.3.3.3. Sidedness of Infant Cradling

Two studies have asked males and females to cradle babies in their arms, or to demonstrate how they would do so. Both studies reported that females were more likely to cradle babies on the left side of their bodies than were males (Table 4.3.3.3).

Table 4.3.3.3. Sidedness of infant cradling.

Nature of Any Difference					Postpubertal	
					Adolescent	Adult
Male more left sided						
No signif. difference						
Female more left sided					**ASIA** *Sri Lanka*: Bruser 1981* **INTERNATIONAL** *Multiple Countries*: Lockard et al. 1979*	**ASIA** *Sri Lanka*: Bruser 1981* **INTERNATIONAL** *Multiple Countries*: Lockard et al. 1979*

4.3.3.4. Sidedness in Electrodermal Activity (Skin Conductivity)

Some studies have compared the tendency for people to respond to various stimuli (particularly of an emotional nature) with regard to electrodermal activation. These studies have either concluded that males exhibit greater laterality in skin conductivity or that there is no significant sex difference (Table 4.3.3.4).

Table 4.3.3.4. Sidedness in electrodermal activity (skin conductivity).

Nature of Any Difference					Postpubertal	
						Adult
Male skin more active						**EUROPE** *Spain*: Roman et al. 1987 (young) **NORTH AMERICA** *United States*: Smith & Ketterer 1982 (young); Boyd & Maltzman 1983 (young)
No signif. difference						**NORTH AMERICA** *United States*: Ketterer & Smith 1977 (young); Meyers & Smith 1986 (young)
Female skin more active						

4.3.3.5. Left Visual Field Advantage

According to one study, males have more of a left visual field advantage (Table 4.3.3.5). Basically, the left visual field is most closely tied to the activation of the right hemisphere of the neocortex as opposed to the left hemisphere.

Table 4.3.3.5. Left visual field advantage.

Nature of Any Difference	Postpubertal
	Adult
Male more	**NORTH AMERICA** *United States*: Siegel-Hinson & McKeever 2002 (college)
No signif. difference	
Female more	

4.3.3.6 Right Visual Field Advantage in a Lexical-Decision Task

Table 4.3.3.6 indicates that males have more of a right field advantage in lexical-decision tasks than do females. Lexical-decision tasks require subjects to decide whether a series of letters flashed on a screen constitute a real word or not.

Table 4.3.3.6. Right field advantage in a lexical-decision task.

Nature of Any Difference	Postpubertal	Multiple Age Categories
	Adult	
Males more	**EUROPE** *Britain*: SL Rossell et al. 2002 (young, lexical visual field task) **NORTH AMERICA** *United States*: Healey et al. 1985 (college); Eviatar et al. 1990 (college)	**NORTH AMERICA** *United States*: Boles 1984; Cornier & Stubbert 1991 (when the need for speed & accuracy were emphasized)
No signif. difference		
Females more		

4.3.3.7. Headedness

One study of rats revealed that male newborns exhibited greater numbers of head movements to the right than was the case for females (Table 4.3.3.7).

Table 4.3.3.7. Headedness.

Nature of Any Difference	Prepubertal
	Infant
Males more	**RODENT** *Rat*: D. Afonso et al. 1993 (postnatal day 1, head movement to the right)
No signif. difference	
Females more	

4.3.3.8. Nosedness

Nosedness has to do with the ability to smell (detect odors) better using one nostril relative to the other. No consistent sex differences with respect to sidedness in odor detection have been found according to Table 4.3.3.8.

Table 4.3.3.8. Nosedness.

Nature of Any Difference	Prepubertal
	Infant
Males more	**NORTH AMERICA** *United States*: Millot & Brand 2000* (smell better with right nostril)
No signif. difference	**NORTH AMERICA** *United States*: Millot & Brand 2000* (no difference in nosedness among women); Doty & Kerr 2005* (no difference in nosedness among men)
Females more	**NORTH AMERICA** *United States*: Doty & Kerr 2005* (smell better using left nostril)

4.3.3.9. Strength of Dominant Versus Non-Dominant Hand

The one available study concluded that there was a greater difference in the strength of dominant versus non-dominant hand among females than among males (Table 4.3.3.9).

Table 4.3.3.9. Strength of dominant versus non-dominant hand.

Nature of Any Difference					Postpubertal		
						Adult	
Males more							
No signif. difference							
Females more						**NORTH AMERICA** *United States*: Nicolay & J Walkers 2005:611	

4.3.3.10. Tailedness

In rats, a couple of studies have investigated gender differences in the side to which the tail tends to be biased. As shown in Table 4.3.3.10, one study revealed a male leftward bias in tail position among newborn rat pups, while the other found no male-female difference.

Table 4.3.3.10. Tailedness.

Nature of Any Difference	Prepubertal						
	Infant						
Males more left-biased	**RODENT** *Rat*: D. Afonso et al. 1993 (postnatal day 1, tail movement)						
No signif. difference	**RODENT** *Rat*: VH Denenberg et al. 1982						
Females more left-biased							

4.3.3.11. Directional Bias in Locomotion

As shown in Table 4.3.3.11, one study of humans found that females were more likely than males to turn rightward when blindfolded. Among mice, however, no gender difference was found in directional turning.

Table 4.3.3.11. Directional bias in locomotion.

Nature of Any Difference					Postpubertal		
						Adult	
Males more							
No signif. difference						**OCEANIA** *Australia*: Bradshaw & Bradshaw 1988* (veer right when attempting to walk straight line blindfolded) **RODENT** *Mouse*: SL Schmidt et al. 1999 (during swim test)	
Females more						**OCEANIA** *Australia*: JL Bradshaw & Bradshaw 1988* (more likely to turn right when blindfolded & asked to turn 360 degrees)	

4.3.4. Voice and Basic Speech Production

Research findings pertaining to sex differences of a vocal nature are presented in the following tables.

4.3.4.1. Vocalizations and the Beginnings of Speech Production

Relative to males, females appear to have an earlier tendency to begin vocalizing and thereby to begin producing the earliest forms of speech (Table 4.3.4.1).

Table 4.3.4.1. Vocalizations and the beginnings of speech production.

Nature of Any Difference	Prepubertal				
	Infant	Toddler	Early Childhood	Childhood	Adult
Males sooner/more				**NORTH AMERICA** *United States*: E Mueller 1972 (during free play with same-sex peer)	
No signif. difference		**NORTH AMERICA** *United States*: Rheingold et al. 1967 (home observation); Kagan 1969; Rheingold & Eckerman 1969; Rheingold & Samuels 1969; Jones & Moss 1971; Yarrow et al. 1971 (home observation); BJ Dodd 1972; C Roberts & Black 1972 (mothers' reports); HS Ross et al. 1972; Clarke-Stewart 1973	**NORTH AMERICA** *United States*: Hartig & Kanfer 1973*	**EUROPE** *Italy*: Greenglass 1971b* **NORTH AMERICA** *United States*: Kohlberg et al. 1968 (egocentric speech during task performance); Shrader & Leventhal 1968 (parents' reports); Szal 1972 (spontaneous competitive, cooperative, and uncooperative vocals); Wolff & Wolff 1972 (teachers' reports); Hartig & Kanfer 1973*	**NORTH AMERICA** *United States*: Sarason & Winkel 1966 (incomplete sentences, sentence corrections, word repetition)
Females sooner/more	**NORTH AMERICA** *United States*: Gatewood & Weiss 1930 (newborn); Balint 1948 (cooing and babbling); AF Korner 1973 (cooing and babbling)	**NORTH AMERICA** *United States*: Terman et al. 1925 (gifted children); S Goldberg & Lewis 1969; M Lewis 1969 (vocalization to mother during play); Lewis & Freedle 1972 (responses to mother); Messer & Lewis 1972:301; Schacter et al. 1978; Huttenlocher et al. 1991	**NORTH AMERICA** *United States*: Coates & Hartup 1969; Halverson & Waldrop 1970; Bell et al. 1971	**NORTH AMERICA** *Canada*: Greenglass 1971b*; *United States*: PK Smith & Connolly 1972 (talking to other children)	

4.3.4.2. Breathiness of Voice

Two studies have compared the voices of males and females with respect to breathiness or softness. Both concluded that the voices of females were breathier (Table 4.3.4.2).

Table 4.3.4.2. Breathiness of voice.

Nature of Any Difference	Postpubertal
	Adolescent
Males breathier	
No signif. difference	
Females breathier	**NORTH AMERICA** *United States*: Pedrey 1945; Tossi et al. 1976

4.3.4.3. Nasality of Voice/Speech

Voice or speech nasality refers to the tendency to direct air and sounds through the nose rather than strictly through the mouth when speaking. This tendency has been found to be more common among females than among males in several studies (Table 4.3.4.3).

Table 4.3.4.3. Nasality of voice/speech.

Nature of Any Difference	Prepubertal		Postpubertal	Multiple Age Categories
	Infant	Childhood	Adult	
Males more				
No signif. difference				
Females more	**NORTH AMERICA** *United States*: Masataka & Bloom 1994	**NORTH AMERICA** *United States*: Stathopoulos & Weismer 1985; Watterson et al. 1996	**NORTH AMERICA** *United States*: Seaver et al. 1991* (young); Litzaw & Dalston 1992 (young)	**NORTH AMERICA** *Canada*: Seaver et al. 1991*; Leeper et al. 1992; *United States*: McKerns & Bzoch 1970; Dalston et al. 1991; MA Hardin et al. 1992; Zajac & Mayo 1996

4.3.4.4. Pleasantness of Voice

A few studies have sought to determine if the voices of male or female infants were considered more pleasant sounding to adults. All of these studies concluded that the voices of males were considered more pleasant (Table 4.3.4.4).

Table 4.3.4.4. Pleasantness of voice.

Nature of Any Difference	Prepubertal
	Infant
Males more	**NORTH AMERICA** *Canada*: Beaumont & Bloom 1993; K Bloom et al. 1993; K Bloom et al. 1999; *United States*: K Bloom & Lo 1990
No signif. difference	
Females more	

4.3.4.5. Voice Onset Time

Voice onset time is the duration of the period of time between the release of a plosive and the beginning of vocal fold vibration. It is usually measured in milliseconds (Table 4.3.4.5).

Table 4.3.4.5. Voice onset time.

Nature of Any Difference	Prepubertal	Postpubertal	Multiple Age Categories
	Childhood	Adult	
Males longer			
No signif. difference		**EUROPE** *Britain*: Whiteside et al. 2004* (young, during low estrogen phase for women)	
Females longer	**EUROPE** *Britain*: Whiteside et al. 2004; Whiteside & Marshall 2001	**EUROPE** *Britain*: Whiteside et al. 2004* (young, during high estrogen phase for women) **NORTH AMERICA** *United States*: Lisker & Abramson 1964; Swartz 1992; Ryalls et al. 1997; Simos et al. 1998	**NORTH AMERICA** *United* States: LL Koenig 2000

4.3.4.6. Voice Resonance

Voice resonance has to do with vocal sounds that are filled with a rich, deep texture. The one study located on sex differences concluded that male voices had more of this quality than did female voices (Table 4.3.4.6).

Table 4.3.4.6. Voice resonance.

Nature of Any Difference	Prepubertal
	Childhood
Males lower	**NORTH AMERICA** *United States*: S Bennett 1981
No signif. difference	
Females lower	

4.3.4.7 Vocal Stress

One study of the degree to which people's voices trembled and otherwise revealed stress concluded that this was more pronounced among females than among males when they were attempting to deceive a listener (Table 4.3.4.7).

Table 4.3.4.7 Vocal stress.

Nature of Any Difference	
	Adult
Males more	
No signif. difference	
Females more	**NORTH AMERICA** *United States*: O'Hair & Cody 1987 (when lying)

4.3.4.8. Vowel Pronunciation, Fundamental Frequency (Fo)

Fundamental frequency refers to the hertz range within which a person's speech occurs. As shown in Table 4.3.4.8, there seems to be no significant sex difference in Fo until after puberty, when it becomes greater in females than for males.

Table 4.3.4.8. Vowel pronunciation, fundamental frequency (Fo).

Nature of Any Difference	Prepubertal				Postpubertal	
			Early Childhood	Childhood	Adolescent	
Males higher						
No signif. difference			**NORTH AMERICA** *United States*: R Kent 1976 (pre-school); S Busby & Plant 1995 (pre-school)	**NORTH AMERICA** *United States*: S Bennett & Weinberg 1979 (school age); S Bennett 1983 (school age); Perry et al. 2001:2991* (fundamental frequency of vowel pronunciation prior to puberty)		
Females higher					**NORTH AMERICA** *United States*: Perry et al. 2001:2991* (fundamental frequency of vowel pronunciation higher after puberty)	

4.3.4.9 Words Spoken per Minute

One study reported that on average adult women spoke more words per minute than did adult men, but another study found no significant difference (Table 4.3.4.9).

Table 4.3.4.9 Words spoken per minute.

Nature of Any Difference					Postpubertal	
						Adult
Males more						
No signif. difference						**NORTH AMERICA** *United States*: VG Walker 1988:16 (young)
Females more						**NORTH AMERICA** *United States*: W Johnson et al. 1963:220

4.4
EMOTIONS

Emotions refer to the feelings one has with respect to a whole host of experiences. These feelings motivate much behavior. As this section reveals, many aspects of emotions have been studied with respect to sex differences. Because emotions are inherently subjective in nature, the vast majority of relevant studies are based on self-reports from human subjects.

4.4.1. Emotionality

Emotionality has to do with the extent to which one has feelings of joy, sadness, anger, and the like in response to daily experiences. Findings of sex differences in emotionality are reviewed below.

4.4.1.1. Emotionality in General

Emotionality refers to the tendency for one's thoughts to be focused on emotional experiences and for one to pay greater attention to emotional issues when interacting with others. Assessing emotionality is difficult, especially in young children, which may explain the substantial number of inconsistent findings among toddlers and children. From adolescence onward, however, nearly all studies have found that females are more emotional than males (Table 4.4.1.1).

Table 4.4.1.1. Emotionality in general.

Nature of Any Difference	Prepubertal				Postpubertal		Multiple Age Categories
	Infant	Toddler	Early Childhood	Childhood	Adolescent	Adult	
Males more	**NORTH AMERICA** *United States*: Weinberg et al. 1994 (6-month-olds)	**NORTH AMERICA** *United States*: Shirley & Poyntz 1941 (when separated from mother)		**NORTH AMERICA** *United States*: T Davis 1995 (negative emotions)		**NORTH AMERICA** *United States*: Seidlitz & Diener 1998* (shortly after experiencing a positive event)	
No signif. difference		**NORTH AMERICA** *United States*: Heathers 1955 (clinging)				**NORTH AMERICA** *United States*: Flemming 1933 (young); Skaggs 1942 (young)	
Females more		**NORTH AMERICA** *United States*: RR Sears et al. 1965; Malatesta & Haviland 1982; J Dunn et al. 1987; S Adams et al. 1995	**NORTH AMERICA** *United States*: Buckner & Fivush 1998	**NORTH AMERICA** *United States*: Castaneda & McCandless1956; M Goldstein 1959	**NORTH AMERICA** *United States*: Guilford & Martin 1944*; Diener et al. 1985* (positive & negative emotions)	**EUROPE** *Britain*: DJ Castle et al. 1993 (among schizophrenics, less emotionally flat); Ones & Anderson 2002; O Evans & Steptoe 2003:768 (speech); *Germany*: Schirmer et al. 2002 (respond more quickly to emotional aspects of speech); *Netherlands*: Heymans 1910 **NORTH AMERICA** *United States*: Burt & Moore 1912 (young); Marston 1923 (young); Porter 1928 (young); Guilford & Martin 1944*; J Allen & Hamsher 1974; J Allen & Haccoun 1976; GE Schwartz et al. 1980 (experimentally presented emotion-provoking imagery); Diener et al. 1985* (young, positive & negative emotions); RJ Larsen & Diener 1987; Fujita et al. 1991 (college); J Cassidy et al. 1992; Grossman & Wood 1993:1018 (response to negative emotion inducing pictures, self report); Grossman & Wood 1993:1013 (emotional intensity); Grossman & Wood 1993:1012 (frequent feelings, more intense); Dowdy et al. 1996 (arthritis patients); LF Barrett et al. 1998; J Gross & John 1998; Seidlitz & Diener 1998* (when recalling past events); JT Spence & Buckner 2000:50 (self-rated); Brebner 2003 (positive & negative emotions)	**EUROPE** *Germany*: Gaup 1929 **NORTH AMERICA** *United States*: Willoughby 1935; Kenney & White 1966; JJ Gross & Levenson 1995

4.4.1.2. Moodiness/Frequent Mood Swings

The one available study of sex differences in moodiness concluded that males and females were statistically equivalent in this regard (Table 4.4.1.2). Nevertheless, this study utilized an unusually restricted sample and was based on childhood recollections.

Table 4.4.1.2. Moodiness/frequent mood swings.

Nature of Any Difference	Prepubertal					
				Childhood		
More males						
No signif. difference				**NORTH AMERICA** *United States*: Luthar et al. 1996:182 (opiate addicts, retrospective childhood recollections by adults)		
More females						

4.4.1.3. General Affection/Attachment Towards Other, Feelings of

As shown in Table 4.4.1.3, studies have revealed that females felt greater affection toward others than did males.

Table 4.4.1.3. General affection/attachment towards others, feelings of.

Nature of Any Difference	Prepubertal	Postpubertal	
	Childhood	Adolescent	Adult
More males			
No signif. difference			
More females	**NORTH AMERICA** *United States*: Olver et al. 1989 (daughters to their mothers)	**NORTH AMERICA** *United States*: E Campbell et al. 1984 (daughters to their mothers); Furman & Buhrmester 1985 (daughters to their mothers)	**NORTH AMERICA** *United States*: K White et al. 1983 (young, daughters to their mothers); S Frank et al. 1988 (daughters to their mothers) **OCEANIA** *Australia*: Brebner 2003:390 (college, frequency & intensity)

4.4.1.4. Emotional Contagion

Sometimes laughter, panic, and even sadness spread almost instantaneously throughout a gathering, a phenomenon known as emotional contagion. According to two studies, females are more susceptible to emotional contagion than are males (Table 4.4.1.4).

Table 4.4.1.4. Emotional contagion.

Nature of Any Difference	Postpubertal
	Adult
Males affected more	
No signif. difference	
Females affected more	**NORTH AMERICA** *United States*: Doherty et al. 1995; Wild et al. 2001

4.4.1.5. Emotional Prosody During Linguistic Interpretation

Three studies suggested that when asked to offer an interpretation of a linguistic passage, women were more likely than men to detect emotional overtones to the passage (Table 4.4.1.5).

Table 4.4.1.5. Emotional prosody during linguistic interpretation.

Nature of Any Difference	Postpubertal
	Adult
Males more	
No signif. difference	
Females more	**EUROPE** *Germany*: Schirmer et al. 2002; Schirmer & Kotz 2003; Schirmer et al. 2005

4.4.2. Anger

Anger has to do with a negative feeling that is usually directed toward another person in response to something that the other person was believed to have intentionally done.

4.4.2.1. Anger in General, Feelings of

Studies of anger have reached varying conclusions with respect to gender differences, with most suggesting that females have such feelings more often or intensely than do males, particularly among adults (Table 4.4.2.1).

Table 4.4.2.1. Anger in general, feelings of.

Nature of Any Difference	Prepubertal		Postpubertal		Multiple Age Categories
	Early Childhood	Childhood	Adolescent	Adult	
Males more	**NORTH AMERICA** *United States*: Goodenough 1931:278; H Goldsmith et al. 1997 (parental ratings, anger prone)	**NORTH AMERICA** *United States*: Brody 1984 (when emotionally evoked); Lagerspetz et al. 1988* (frequency); Strayer & Roberts 1997	**NORTH AMERICA** *United States*: ID Harris & Howard 1987; JC Stapley & Haviland 1989	**NORTH AMERICA** *United States*: Biaggio 1989 (self-report); Fehr & Baldwin 1996* (provoked by strangers); Fehr et al. 1999* (provoked by strangers); C Anderson & Berdahl 2002 (display anger more); Keltner et al. 2003 (display anger more)	
No signif. difference		**NORTH AMERICA** *United States*: Luthar et al. 1996:182 (short tempered, opiate addicts, retrospective childhood recollections); Buntaine & Costenbader 1997 (self-report)	**NORTH AMERICA** *United States:* Hurlock 1927(7th & 8th grade, questionnaire); Sears 1961; Ewart & Kolodner 1994; Clay et al. 1996(7-17yrs, questionnaire)	**EUROPE** *England*: Archer et al. 1995 (England, college assess by questionnaire) **NORTH AMERICA** *Canada*: Greenglass & Julkunen 1989 (college); *United States*: Shields 1984; Siegel 1986 (40-63 yrs, questionnaire); Spielberger 1988 (adult, assessed by questionnaire); Unverzagt & Schill 1989 (US, college, assess by questionnaire); Buss & Perry 1992 (college, assess by questionnaire); Grossman & Wood 1993:1012; HL Wagner et al. 1993; MB Harris 1994; Kiring & Gordon 1998 **OCEANIA** *New Zealand*: Knight et al. 1995 **INTERNATIONAL** *Multiple Countries*: Lucas & Gohm 2000; AH Fischer et al. 2004:90	**ASIA** *India*: Prasad 1980 (college questionnaire); *Russia*: Eckhardt et al. 1995 (16-27 yrs, assess by questionnaire); Prasad 1980 (college questionnaire) **NORTH AMERICA** *United States*: Hoglund & Nichols 1995 (17-45 yrs. assessed by questionnaire)
Females more		**NORTH AMERICA** *United States*: Lagerspetzet al. 1988* (retain longer)		**NORTH AMERICA** *United States*: Conger et al. 1993 (experience anger & hostility); LR Brody et al. 1995 (hypothetical scenarios); Mirowsky & Ross 1995:465 (experience anger & hostility); Fehr & Baldwin 1996* (provoked by intimates); Rusting & Nolen-Hoeksema 1998 (ruminate about anger-inducing experiences); Fehr et al. 1999* (provoked by intimates) **OCEANIA** *Australia*: Biaggio 1989 (experimental provocation); Brebner 2003:390 (college, frequency & intensity)	

4.4.2.2. Angry Response to Frustration and Inconsiderate Behavior

Most research concerned with gender differences in angry responses to frustration has indicated that the tendency is more prevalent in males, although inconsistent findings have been reported particularly among adults (Table 4.4.2.2).

Table 4.4.2.2. Angry response to frustration and inconsiderate behavior.

Nature of Any Difference	Prepubertal	Postpubertal	Multiple Age Categories
	Infant	Adult	
More males	**NORTH AMERICA** *United States*: S Phillips et al. 1978	**NORTH AMERICA** *United States*: Nunn & S Thomas 1999* (young, with low self-esteem)	**NORTH AMERICA** *United States*: CW Turner et al. 1975
No signif. difference		**NORTH AMERICA** *United States*: Nunn & S Thomas 1999* (young, with high self-esteem)	
More females		**EUROPE** *Finland*: Haukkala 1999:448	

4.4.2.3. Anger Inhibition/Suppression

A few studies have compared males and females with respect to their tendencies to inhibit/suppress whatever anger they may be feeling. These studies have not reached consistent conclusions (Table 4.4.2.3).

Table 4.4.2.3. Anger inhibition/suppression.

Nature of Any Difference						Postpubertal
						Adult
More among males						**EUROPE** *Britain*: Stoney & Engrebetson 1994 (young) **NORTH AMERICA** *United States*: McConatha et al. 1994 (young)
No signif. difference						
More among females						**NORTH AMERICA** *Canada*: Benson & Fuchs 1999 (among people with mental retardation); *United States*: Lerner 1980; Liste 1999

4.4.2.4. Anger Suppression Related to Ill Health

One study sought evidence of gender differences in whether or not anger suppression adversely affects health. It concluded that such suppression of anger predicted earlier mortality in females than in males (Table 4.4.2.4).

Table 4.4.2.4. Anger suppression related to ill health.

Nature of Any Difference						Postpubertal
						Adult
More among males						
No signif. difference						
More among females						**NORTH AMERICA** : *United States*: Harburg et al. 2003

4.4.3. Fearfulness

Fearfulness refers to a largely unpleasant emotion that is felt in anticipation of, or the actual experience of, an event that often causes physical harm or sadness. The considerable research on sex differences in fearfulness is presented below.

4.4.3.1a. Fearfulness in General Prepubertal Humans

In humans, fearfulness is usually measured with self-reports such as on a scale of from one to ten. Split-Table 4.4.3.1a consistently indicates that human females exhibit feeling fearful more than do males.

Split-Table 4.4.3.1a. Fearfulness in general prepubertal humans.

Nature of Any Difference	Prepubertal			
	Infant	Toddler	Early Childhood	Childhood
Males more		**NORTH AMERICA** *United States*: Lewis et al. 1989 (toward a stranger)		
No signif. difference				
Females more	**EUROPE** *Hungary*: Nagy et al. 2001 (mother-rated onset of fear)	**NORTH AMERICA** *United States*: Gunnar & Stone 1984 (toward a dangerous looking toy); Kagan 1994	**NORTH AMERICA** *United States*: Jersild & Markey 1935 (fearful of more things); Hattwick 1937 (researcher rated fearfulness)	**ASIA** *China*: Q Dong et al. 1994*; Ollendick et al. 1995* **EUROPE** *Britain*: Marks 1969; Ollendick et al. 1989 **MIDDLE EAST** *Israel*: Klingman & Wiesner 1982 (intensity) **NORTH AMERICA** *Canada*: Cote et al. 2002a:612; *United States*: Wickman 1928 (teacher ratings of fearful behavior); Jersild & Homes 1935 (fearful of more things); Terman & Miles 1936; Pratt 1945 (rural); Lapouse & Monk 1959; Croake & Knox 1973; Sidana 1975; Ollendick 1983; WK Silverman & Nelles 1987; PM Davidson et al.1989; Ollendick et al. 1989*; Ollendick et al. 1991*; J Stevenson et al. 1992*; Gullone & NJ King 1993; Breslau et al. 1995; Lewinsohn et al. 1998* (self-report) **OCEANIA** *Australia*: GJ Boyle & Start 1989:484; Burnham & Gullone 1997:170*

4.4.3.1b. Fearfulness in General Prepubertal Humans

From adolescence onward, females have been found to exhibit greater fearfulness than males (Split-Table 4.4.3.1b).

Split-Table 4.4.3.1b. Fearfulness in general postpubertal humans.

Nature of Any Difference	Postpubertal		Multiple Age Categories
	Adolescent	Adult	
Males more			
No signif. difference			
Females more	**ASIA** *China*: Q Dong et al. 1994*; Ollendick et al. 1995* **EUROPE** *Britain*: A Simon & Ward 1974 **MIDDLE EAST** *Iran*: Firoozi & Mazidi 1995 **NORTH AMERICA** *Canada*: Jacques & Mash 2004 (self-report); *United States*: Lapouse & Monk 1959; Achenbach & Edelbrock 1981; Ollendick 1983; Ollendick et al. 1989*; Ollendick et al. 1991*; KA Pierce & Kirkpatrick 1992 (video to verify self-reports); J Stevenson et al. 1992*; Gullone & King 1993*; Williams et al. 1994; Fredrikson et al. 1996 (dentists & dental pain); Lewinsohn et al. 1998* (self-report) **OCEANIA** *Australia*: Burnham & Gullone 1997:170*	**AFRICA** *South Africa*: SG Lee 1969 (Zulu) **EUROPE** *Britain*: RM Clarke 1986 (medical school, academic failure) **MIDDLE EAST** *Iran*: Mazidi 2005 (college) **NORTH AMERICA** *United States*: Geer 1965 (young); Hupka & Eshett 1988 (as a jealous response); Matthews & Stoney 1988; Blier & Blier 1989 (young); Matthews et al. 1991; Joiner et al. 1999 (college); MB Harris & Miller 2000:857 (young) **OCEANIA** *Australia*: Brebner 2003:390 (college, frequency & intensity) **INTERNATIONAL** *Multiple Countries*: AH Fischer et al. 2004:90	**EUROPE** *Britain*: Scherer et al. 1986 **NORTH AMERICA** *United States*: JJ Michaels & Goodman 1934 (ages 6-16); Terman & Miles 1936; M Horner 1968; Kirkpatrick 1984; Holtzman et al. 1997 (of dentists & dental pain); Pigott 1999 (clinical) **INTERNATIONAL** *Multiple Countries*: Scherer et al. 1986

4.4.3.1c. Fearfulness in General Non-Humans

Assessing fearfulness and anxiety is obviously more problematic among nonhumans than among humans. Behavioral indicators of these emotions are crouching, shaking, and freezing. Using such indicators, numerous studies have investigated possible sex differences. Split-Table 4.4.3.1c shows that among rodents, males have usually been found to be more fearful and anxious than females, but among at least one species of nonhuman primate (*rhesus macaque*), the opposite pattern has been found.

Split-Table 4.4.3.1c. Fearfulness in general non-humans.

Nature of Any Difference	Prepubertal				Postpubertal		Multiple Age Categories
		Toddler			Adolescent	Adult	
Males more					**RODENT** *Rat*: WJ Meyers 1962	**RODENT** *Rat*: EE Anderson 1940 (young); Denenberg & Morton 1962; Nakamura & Anderson 1962 (young); PJ Woods 1962; Levine & Broadhurst 1963 (young); JA Gray et al. 1969 (young); Gray 1971; DM Quadagno et al. 1972* (compared to estrous females); Gray & Lalljee 1974; Maren et al. 1994 (conditioned contextual environment, shock)	**RODENT** *Rat*: Van Oyen et al. 1980; Van Haaren & Van de Poll 1984a; Van Haaren & Van de Poll 1986
No signif. difference						**APE** *Chimpanzee*: Yerkes & Yerkes 1936 (young); Yerkes & Yerkes 1936 (in response to novel objects)	
Females more		**PRIMATE (EXCEPT APE)** *Rhesus Macaque*: Alpert & Rosenblum 1974				**PRIMATE (EXCEPT APE)** *Rhesus Macaque*: WA Mason et al. 1960 (young); WA Mason et al. 1960 (response to human stares)	**PRIMATE (EXCEPT APE)** *Rhesus Macaque*: Sassenrath 1970 **RODENT** *Rat*: Perrot-Sinal et al. 1996* (in a Morris water maze)

4.4.3.2a. Fearfulness/Reluctance to Explore Novel Stimuli, Human

Because the findings from studies of humans on fear of exploration are based on quite different methodology than is the study of nonhuman and come to quite different conclusions, split-tables are presented. As shown in Table 4.4.3.2a, limited research indicates that among school age children and adult humans, females seem to be more fearful of unfamiliar environments and/or objects.

Table 4.4.3.2a. Fearfulness/reluctance to explore novel stimuli, human.

Nature of Any Difference	Prepubertal	Postpubertal
	Childhood	Adult
Males more		
No signif. difference		
Females more	**NORTH AMERICA** *United States*: Sheehy 1938	**NORTH AMERICA** *United States*: Gullone & King 1993 (young, new objects & situations)

4.4.3.2b. Fearfulness Inferred Based on Locomotion/Exploration in an Open Field, Non-Human

When rodents are placed in open field, they initially freeze and then slowly begin to move about. Thus, researchers have inferred that a prolonged failure to explore a novel open environment is an indication of fearfulness. As shown in Table 4.4.3.2b, using this indicator, most studies have concluded that male rats are more fearful than their female counterparts.

Table 4.4.3.2b. Fearfulness inferred based on locomotion/exploration in an open field, non-human.

Nature of Any Difference	Prepubescent		Postpubertal
		Childhood	Adult
Males freeze more (explore less)	**BIRDS** *Chickens*: RB Jones 1977a; RB Jones 1986; RB Jones 1989		**RODENT** *Rat*: WR Thompson 1953; Zimbardo & Montgomery 1957; PL Broadhurst 1958a; PL Broadhurst 1958b; Nakamura & Anderson 1962 (young); Levine & Broadhurst 1963; R. Ader 1965*; JA Gray et al. 1965; DM Quadagno et al. 1972*; B Zimmerberg & Mickus 1990; JA Osborn et al. 1998; JA Osborn et al. 1998b; M Giordano & Mejia-Viggiano 2001; Tayyabkhan et al. 2002; MA Wilson et al. 2004
No signif. difference		**RODENT** *Rat*: DM Quadagno et al. 1972*	**RODENT** *Mouse*: ND Henderson 1967b; McReynolds et al. 1967; *Rat*: Broadhurst 1957*
Females freeze more (explore less)			

4.4.3.2c. Fearfulness Inferred Based on Defecation in an Open Field

As with location (discussed above), defecation frequency in a novel open field has been used as an indicator of fearfulness, with the greatest frequency considered an indication of fearfulness. Table 4.4.3.2c shows that most studies have failed to find a significant gender difference in inferred fearfulness using defecation as the indicator.

Table 4.4.3.2c. Fearfulness inferred based on defecation in an open field.

Nature of Any Difference	Postpubertal
	Adult
Males more	**RODENT** *Rat*: PL Broadhurst 1958b; JA Gray et al. 1965
No signif. difference	**RODENT** *Mouse*: PL Broadhurst 1958a; WR Thompson et al. 1962; R Ader 1965*; DM Quadagno et al. 1972
Females more	

4.4.3.2d. Fearfulness Inferred Based on Elevated Plus Maze Performance

The elevated plus maze is primarily designed to create anxiety for rodents in ways that can be objectively measured by researchers. It was designed around evidence that rats and mice tend to explore an unfamiliar environment although they have an aversion to such things as bright lights and open spaces. Table 4.4.3.2d suggests that findings have been somewhat inconsistent regarding any gender difference in fearfulness based on performance in elevated plus mazes.

Table 4.4.3.2d. Fearfulness inferred based on elevated plus maze performance.

Nature of Any Difference					Postpubertal		
					Adolescent	Adult	
Males exhibit more anxiety					**RODENT** *Rat*: Ferguson & Gray 2005* (time spent in closed arms)	**RODENT** *Rat*: AL Johnston 1991 (time spent in closed arms); Zimmerberg & Farley 1993 (time spent in closed arms)	
No signif. difference						**RODENT** *Rat*: NL Da Silva et al. 1996 (number of arm entries, test of fearfulness); NL Da Silva et al. 1996 (time spent); Ferguson & Gray 2005* (time spent in closed arms)	
Females exhibit more anxiety						**RODENT** *Rat*: JT Imhof et al. 1993 (arm entries); JA Osborn et al. 1998 (exploration); AL Johnston & File 1999 (open arm entries, anxiety test)	

4.4.3.3. Fear of AIDS

According to most relevant studies, males are more fearful of contracting AIDS than are females (Table 4.4.3.3).

Table 4.4.3.3. Fear of AIDS.

Nature of Any Difference					Postpubertal		
						Adult	
Males more						**NORTH AMERICA** *United States*: M Goodwin & Roscoe 1988 (young); McDevitt et al. 1989 (young); K Bruce et al. 1990 (young); Chng & A Moore 1991 (young); Negy et al. 1991 (young); Ashcraft & Schlueter 1993 (young); R Young et al. 1993 (young); T O'Hare et al. 1996 (young); Waldner et al. 1999 (young)	
No signif. difference						**NORTH AMERICA** *Canada*: Ramsum et al. 1993 (young); *United States*: Kunkle & Temple 1992; Cleary et al. 2004:43	
Females more							

4.4.3.4. Fear of Animals

Sex differences in fear of animals, or at least those that constitute large predators such as lions, tigers, and bears, have been investigated by several studies. All of these studies have concluded that females express greater fear than do males (Table 4.4.3.4).

Table 4.4.3.4. Fear of animals.

Nature of Any Difference	Prepubertal			Postpubertal		Multiple Age Categories
			Childhood		Adult	
Males more						
No signif. difference						
Females more			**NORTH AMERICA** *United States*: Arrindell 2000		**EUROPE** *Britain*: Davey 1992 (spiders) **INTERNATIONAL** *Multiple Countries*: Davey et al. 1998:744 (young)	**EUROPE** *Britain*: Davey 1994; *Norway*; Ohman 1986 (large predators); Roskaft et al. 2003:187 (large predators) **NORTH AMERICA** *United States*: CG Costello 1982a (large predators)

4.4.3.5. Fear of Death

The limited evidence on sex differences in fearing death found either no sex difference or that females expressed more fear than did males (Table 4.4.3.5).

Table 4.4.3.5. Fear of death.

Nature of Any Difference					Postpubertal		
						Adult	
Males more							
No signif. difference						**MIDDLE EAST** *Israel*: Carmel 2001:953 (elderly)	
Females more						**NORTH AMERICA** *United States*: Depaola et al. 2003	

4.4.3.6. Fear of Giving Blood

All studies of the extent to which males and females fear giving blood have concluded that females do so to a greater extent than males (Table 4.4.3.6).

Table 4.4.3.6. Fear of giving blood.

Nature of Any Difference	Prepubertal				Postpubertal	
				Childhood	Adolescent	Adult
Males more						
No signif. difference						
Females more				**NORTH AMERICA** *United States*: Aho & Erickson 1985*	**NORTH AMERICA** *United States*: Aho & Erickson 1985*	**EUROPE** *Germany*: Schienle et al. 2003; *Netherlands*: Muris et al. 1999 (self-report) **NORTH AMERICA** *United States*: Graham et al. 1961; Farley et al. 1982 (college); Kleinknech et al. 1997 (college); Labus et al. 2000; Olatunji et al. 2005 (college) **INTERNATIONAL** *Multiple Countries*: Arrindell et al. 2003 (college)

4.4.3.7. Fear of Pain and Injury

The limited research on fear of pain has reached conflicting conclusions regarding any sex difference (Table 4.4.3.7).

Table 4.4.3.7. Fear of pain and injury.

Nature of Any Difference	Prepubertal					
				Childhood		
Males more				**NORTH AMERICA** *United States*: Mechanic 1964		
No signif. difference						
Females more				**NORTH AMERICA** *United States*: L Peterson et al. 1994 (when riding a bicycle)		

4.4.3.8. Fear of Crime Victimization

Nearly all studies have concluded that females are more fearful than males of being victimized by crime (Table 4.4.3.8).

Table 4.4.3.8. Fear of crime victimization.

Nature of Any Difference	Postpubertal		Multiple Age Categories
	Adolescent	Adult	
Males more			
No signif. difference		**NORTH AMERICA** *United States*: GR Lee 1984 (elderly); Ferraro 1995* (control for fear of sexual assault)	
Females more	**NORTH AMERICA** *United States*: DC May & Dunaway 2000	**NORTH AMERICA** *Canada*: Vitelli & Endler 1993:79 (young); Sprott 1999; *United States*: Gordon et al 1980; Langworthy & Whitehead 1986; Akers et al. 1987:499 (elderly); Moore & Trojanowitz 1988; Parker 1988; LaGrange & Ferraro 1989:713; Haynie 1998:41	**ASIA** *Japan*: Ito 1993:387 **EUROPE** *Britain*: Box et al. 1988; Crawford et al. 1990; Stanko 1990:122; *Scotland*: Monaghan 1997:22 **LATIN AMERICA** *Mexico*: Ramos & Andrade 1990; Lira & Andrade-Palos 1993 **NORTH AMERICA** *Canada*: Vitelli & Endler 1993; *United States*: Erskine 1974; Lebowitz 1975; Clemente & Kleiman 1977:527; Baumer 1978; Hindelang et al. 1978; Riger et al. 1978; Balkan 1979; Baumer 1980; Dubow et al. 1979; Garofalo 1979; Braungart et al. 1980; Garofalo 1981; Skogan & Maxfield 1981:14; Lee 1982; Riger et al. 1982; Stafford & Galle 1984; Warr 1984; GD Hill et al. 1985; Ortega & Myles 1987; Liska et al. 1988; Bankston & Thompson 1989; Parker & Ray 1990; Ferraro & LaGrange 1992; Maguire & Pastore 1994:188; KD Parker et al. 1993; Taylor & Covington 1993:390; Ferraro 1995:88*; Haghihi & Sorenson 1996; MB Harris 1996; Chiricos et al. 1997:122; Reid & Konrad 2004 **OCEANIA** *Australia*: Mugford 1984; Rossini 1988 **INTERNATIONAL** *Multiple Countries*: van Dijk et al. 1991:78

4.4.3.9. Fear of Public Places (Agoraphobia)

One study was located concerning a possible sex difference in fear of public places. It indicated that agoraphobia was more common among females than among males (Table 4.4.3.9).

Table 4.4.3.9. Fear of public places (agoraphobia).

Nature of Any Difference	Multiple Age Categories
Males more	
No signif. difference	
Females more	**NORTH AMERICA** *United States*: DL Chambless & Mason 1986

4.4.3.10. “Fear of Success”

The idea that some people fear success more than do others may ultimately be explained by noting that success at any endeavor always entails a risk of failure, and that some people are much more willing to take such risks than are others. The few studies that have sought evidence that one sex is more likely to fear success than the other sex have either concluded that females do so more or that there are no significant male-female differences (Table 4.4.3.10).

Table 4.4.3.10. “Fear of success”.

Nature of Any Difference	Postpubertal		Multiple Age Categories
	Adolescent	Adult	
Males more			
No signif. difference		**NORTH AMERICA** *United States*: A Levine & Crumrine 1975; Tresemer 1976	
Females more	**NORTH AMERICA** *United States*: Butler & Nissan 1975		**NORTH AMERICA** *United States*: M Horner 1968; Orlofsky 1978

4.4.3.11. Social Fears

One study of sex differences in social fears concluded that this was more intense among females than among males (Table 4.4.3.11).

Table 4.4.3.11. Social fears.

Nature of Any Difference	Prepubertal
	Early Childhood
Males more	
No signif. difference	
Females more	**NORTH AMERICA** *United States*: Jersild & Homes 1935 (fear of strangers & social mishaps)

4.4.4. Jealousy and Envy

Jealousy and envy are common types of human emotions although they are rarely openly discussed. These emotions are most likely to occur when others have possessions or sex partners that someone else desires.

4.4.4.1. Jealousy and Envy in General (Non-Sexual)

Studies of sex differences in general (non-sexual) feelings of jealousy have indicated that in childhood females admit to having more feelings of jealousy and envy than do males (Table 4.4.4.1). Among college-age adults, however, the evidence is mixed. Males are more jealous of others who are of higher status than themselves and females tend to be more envious of others who are more physically attractive than themselves.

Table 4.4.4.1. Jealousy and envy in general (non-sexual).

Nature of Any Difference	Prepubertal		Postpubertal
	Early Childhood	Childhood	Adult
Males more			**EUROPE** *Netherlands*: Dijkstra & Buunk 2002* (college, higher status rivals) **NORTH AMERICA** *United States*: Dijkstra & Buunk 1998* (college, dominant or rich rivals); DM Buss et al. 2000* (college, dominant or rich rivals)
No signif. difference			
Females more	**NORTH AMERICA** *United States*: S Foster 1927 (preschool); M Sewall 1930 (preschool);	**NORTH AMERICA** *United States*: BM Ross 1931; MC Jones & Burks 1936:13	**EUROPE** *Netherlands*: Dijkstra & Buunk 2002* (college, more attractive rivals) **NORTH AMERICA** *United States*: Dijkstra & Buunk 1998* (college, more physically attractive rivals); DM Buss et al. 2000* (college, more physically attractive rivals)

4.4.4.2. Jealousy in Response to Love/Emotional Infidelity

One of the most common events that triggers feelings of jealousy is that of experiencing (or even contemplating) a loved sex partner or spouse falling in love with someone else. As shown in Table 4.4.4.2, several studies have sought to determine if males or females are more likely to have these feelings, and most have found that females express stronger feelings of jealousy than do males. In the table following this one, results from several of the same studies are presented with regard to a related, but distinguishable issue: jealousy in response to sexual infidelity.

Table 4.4.4.2. Jealousy in response to love/emotional infidelity.

Nature of Any Difference	Postpubertal
	Adult
Males more	**NORTH AMERICA** *United States*: JM Bailey et al. 1994:1088 (young)
No signif. difference	**NORTH AMERICA** *United States*: CR Harris & Christenfeld 1996 (distress); CR Harris 2000 (college, distress); DeSteno et al. 2002 (college) **INTERNATIONAL** *Multiple Countnies*: B Buunk & Hupka 1987 (college)
Females more	**ASIA** *China*: Geary et al. 1995* (college, over-emotional) **EUROPE** *Germany*: Buunk et al. 1996* (emotional infidelity); Buunk et al. 1996*; *Netherlands*: Buunk et al. 1996* (young); *Sweden*: Wiederman & Kendall 1999b (young) **NORTH AMERICA** *United States*: Larsen & Buss 1991 (college); DM Buss et al. 1992 (college, adult, emotional infidelity); Wiederman & Allgeier 1993 (young); Geary et al. 1995* (college, over-emotional); Buunk et al. 1996* (emotional infidelity); Buunk et al. 1996* (college); DM Buss & Larsen 1996 (college); Cann et al. 2001 (college); Geary et al. 2001 (college, distress); D DeSteno et al. 2002; Pietrzak et al. 2002 (college); Shackelford et al. 2002 (college, harder to forgive); Dantzker & Eisenman 2003 (Hispanic, college); Cann & Baucom 2004 (college); Sagarin & Guadagno 2004 (extreme jealousy in the context of an actual romantic relationship, college) **INTERNATIONAL** *Multiple countries*: Buunk et al. 1996* (college); DM Buss et al. 1999 (college)

4.4.4.3. Jealousy in Response to Sexual Infidelity

Using data derived from self-reports, several studies have assessed whether males or females are more likely to feel jealousy (or distress) in response to experiencing or contemplating the possibility that their spouse or mate had been sexually unfaithful. Table 4.4.4.3 shows that the majority of these studies concluded that males are more likely to have stronger feelings of jealousy than females. However, a couple of studies found no significant difference, and one study based on a relatively small sample of Hispanic college students concluded that females responded with greater feelings of jealousy than males (Dantzker & Eisenman 2003).

Table 4.4.4.3. Jealousy in response to sexual infidelity.

Nature of Any Difference					Postpubertal	
						Adult
Males more						**ASIA** *China*: Geary et al. 1995* (young) **EUROPE** *Sweden*: Wiederman & Kendall 1999b (young, distress) **NORTH AMERICA** *United States*: G L White 1981 (imagined); Larsen & Buss 1991 (young); DM Buss 1992 (college); Wiederman & Allgeier 1993 (young); JM Bailey et al. 1994:1088 (young); Geary et al. 1995* (young); DM Buss et al. 1996 (college); Cann et al. 2001 (college); Geary et al. 2001 (college, distress); Jankowiak et al. 2002:13; Pietrzak et al. 2002 (college); Shackelford et al. 2002 (college, harder to forgive); Cann & Baucom 2004 (college) **INTERNATIONAL** *Multiple Countries*: Buunk & Hupka 1987 (imagined); Buunk et al. 1996 (college); DM Buss et al. 1999 (college)
No signif. difference						**NORTH AMERICA** *United States*: CR Harris 1993a; MW Wiederman & Allegier 1993; CR Harris & Christenfeld 1996 (distress); CR DeSteno et al. 2002 (college)
Females more						**ASIA** *China*: Geary et al. 1995*; *Korea*: DM Buss et al. 1999* (young); *Japan*: DM Buss et al. 1999 (young) **EUROPE** *Sweden*: MW Wiederman & Kendall 1999 **NORTH AMERICA** *United States*: Geary et al. 1995*; DeSteno & Salovey 1996; DM Buss et al. 1999* (young); DM Buss et al. 2000 (of rivals more physically attractive); Dantzker & Eisenman 2003 (Hispanic, college)

4.4.5. Sadness

Sadness is a negative emotion that has received considerable research attention with regard to possible gender differences.

4.4.5.1. Sadness (Dysphoria) in General

Several studies have unanimously concluded that sadness is more common among females than among males (Table 4.4.5.1).

Table 4.4.5.1. Sadness (dysphoria) in general.

Nature of Any Difference					Postpubertal	
					Adolescent	Adult
Male more						
No signif. difference						
Females more					**NORTH AMERICA** *United States*: ID Harris & Howard 1987; Ewart & Kolodner 1994; CS Martin et al. 2000	**NORTH AMERICA** *United States*: JP Newman 1986 (self-report) **OCEANIA** *Australia*: Brebner 2003 (college, frequency and intensity) **INTERNATIONAL** *Multiple Countries*: AH Fischer et al. 2004:90

4.4.5.2. Bereavement/Grief After Death of a Loved One

The available evidence suggests that, with the possible exception of the elderly (in which there is no sex difference), females appear to bereave the death of a loved one more than do males (Table 4.4.5.2).

Table 4.4.5.2. Bereavement after death of a loved one.

Nature of Any Difference					Postpubertal	
						Adult
Males more						
No signif. difference						**NORTH AMERICA** *United States*: Clayton et al. 1971 (elderly)
Females more						**NORTH AMERICA** *United States*: Stinson et al 1992 (parental loss after miscarriage); R Schwab 1996:109 (parental grief); K Sidmore 1999:360 (parental bereavement)

4.4.5.3. Being Upset Over Breakups in a Relationship

Studies of possible sex differences in the degree of distress one feels (or would feel) over breaking up with a sexual/bonding relationship concluded that females expressed greater degrees of distress than did females, although one study found the opposite pattern (Table 4.4.5.3).

Table 4.4.5.3. Being upset over breakups in a relationship.

Nature of Any Difference	Postpubertal
	Adult
Males more	**NORTH AMERICA** *United States*: Rubin et al. 1981 (college)
No signif. difference	
Females more	**NORTH AMERICA** *United States*: AV Horwitz et al. 1996; NF Marks & Lambert 1998; R Simon 2002

4.4.6. Stress/Distress/Worry/Anxiety

The emotions of distress, worry, and anxiety are subjective feelings although they have been shown to have neurological and other physiological accompaniments.

4.4.6.1a. Stress/Distress/Worry/Anxiety in General, Prepubertal Humans

In many studies, a distinction has been made between feelings of stress and anxiety in general and feeling of stress and anxiety due to a specific life event (with the latter covered in tables that follow). Split-Table 4.4.6.1a shows that the studies of children have not reached consistent conclusions regarding any gender differences in feelings of stress, anxiety, and the like.

Split-Table 4.4.6.1a. Stress/distress/worry/anxiety in general, prepubertal humans.

Nature of Any Difference	Prepubertal	
	Early Childhood	Childhood
Males more	**NORTH AMERICA** *United States*: Gove & Herb 1974* (mental stress/distress)	**NORTH AMERICA** *United States*: Gove & Herb 1974* (mental stress/distress)
No signif. difference	**NORTH AMERICA** *United States*: G Mendel 1965; P Cohen et al. 1993a*	**NORTH AMERICA** *United States*: L'Abate 1960; Malpass et al. 1960; Keller & Rowley 1962*
Females more	**NORTH AMERICA** *United States*: Jersild et al. 1941; Zahn-Waxler et al. 1992 (when they perceive others in pain); Tout et al. 1998:1254	**NORTH AMERICA** *United States*: Sontag 1947; Castaneda & McCandless 1956; Palermo 1959 (older school age); SB Sarason et al. 1960; Knights 1963; Rie 1963; Loughlin et al. 1965; K Barton 1971; Reynolds & Richmond 1978; Eisenberg & Fabes 1995 (after watching a frightening movie); WK Silverman et al. 1995; MR Dadds et al. 1998*; Pomerantz et al. 2002:401

4.4.6.1b. Stress/Distress/Worry/Anxiety in General, Adolescent Humans

Among adolescents, most studies have found feelings of stress, distress, worry, and anxiety to be more common or intense among females than among males (Split-Table 4.4.6.1b).

Split-Table 4.4.6.1b. Stress/distress/worry/anxiety in general, adolescent humans.

Nature of Any Difference	Postpubertal
	Adolescent
Males more	**NORTH AMERICA** *United States*: Rudolph & Hammen 1999* ("self-generated" stress)
No signif. difference	**ASIA** *China*: Y Wu et al. 2000*
Females more	**ASIA** *Japan*: Takakura & Sakihara 2001 **EUROPE** *Netherlands*: Kerr & Vlaminkx 1997 (anxiety over taking risks) **MIDDLE EAST** *Kuwait*: Abdel-Khalek 2002 **NORTH AMERICA** *Canada*: RJ Burke & Weir 1978; D'Arcy & Siddique 1984; *United States*: HJ Schubert & Wagner 1936; Goda & Griffith 1962 (people with mental retardation); Keller & Rowley 1962*; BN Phillips 1962; Feldhusen & Denny 1965; B Brenner 1970; Gove & Herb 1974*; Simmons & Rosenberg 1975; DE Bush et al. 1977/1978; O'Mally & Bachman 1979; Savin-Williams 1979; Tobin-Richards et al. 1983; Swearington & Cohen 1984; BE Compas et al. 1985; Goodyer et al. 1986; P Tolan et al. 1988; WN Friedrich et al. 1988; Allgood-Merten & Lewinsohn 1990; Prokopcakova 1992; P Cohen et al. 1993a *; MR Dadds et al. 1998*; DA Cole et al. 1999 (anxiety) RJ Turner & Gil 2002

4.4.6.1c. Stress/Distress/Worry/Anxiety in General, Adult Humans

General feelings of stress, distress, worry, and anxiety among adults and multiple-age samples have concluded that females experience more feelings than do males (Split-Table 4.4.6.1c).

Split-Table 4.4.6.1c. Stress/distress/worry/anxiety in general, adult humans.

Nature of Any Dif-ference	Postpubertal	Multiple Age Categories
	Adult	
Males more		
No signif. difference	**ASIA** *China*: Wu et al. 2000* **EUROPE** *Britain*: DB O'Connor et al. 2003:213 (college, self rated, college) *Germany*: Lautenbacher & Rollman 1993 **NORTH AMERICA** *United States*: JA Taylor 1953 (college); Bendig 1954 (college); Bendig 1960 (college); Wrightsman 1962 (college); Markush & Favero 1974 (in daily life); TH Holmes & Masuda 1974; Fenigstein et al. 1975 (college) Schocken et al. 1987 (coronary artery disease patients)	**NORTH AMERICA** *United States*: Uhlenhuth et al. 1974 (life stress); Mellinger et al. 1978; RJ Turner et al. 1995*
Females more	**ASIA** *China*: Y Wu et al. 2000* (young) **EUROPE** *Britain*: Crisp & Priest 1971; S Fisher & Hood 1988:315 (college); Mellanby et al. 2000:384 (college); *Netherlands*: Craske 2003; *Spain*: Matud 2004; *Sweden*: Ekehammar 1974 (young); Hallman et al. 2002; *Switzerland*: Angst et al. 1997 **LATIN AMERICA** *Brazil*: Dressler et al. 1998b:436 **MIDDLE EAST** *Israel*: Kark et al. 1996 **NORTH AMERICA** *Canada*: Engelsmann et al. 1972:154; J Murphy 1990; McCann et al. 1991 (young); Walters et al. 2002:678; M Denton et al. 2004:2592 (except financial stress); *United States*: DC Leighton 1956; Sinick 1956 (college); Cosentino & Heilbrun 1964 (college); DE Olds & Shaver 1980:333 (young); Richert 1981 (young); RC Kessler & McLeod 1984; Fishbain et al. 1986 (chronic pain patients); Stoner & Spencer 1986; JR Turner & Avison 1987; Schocken et al. 1987 (coronary artery disease patients); Wethington et al. 1987; Regier et al. 1988; Schag & Heinrich 1989 (cancer patients); RJ Turner & Avison 1989 (negative life events); Hagnell & Grasbeck 1990; Regier et al. 1990a; Verbrugge 1990; Baum & Grunberg 1991; J Bernstein & Carmel 1991; McCann et al. 1991 (college); G Sparks 1991 (by horror films); Ochoa et al. 1992; V Walters 1993; Breslau et al. 1995; RJ Turner et al. 1995*; E Lindberg et al. 1997 (young); SH Stewart et al. 1997 (medical students); Almeida & Kessler 1998; Oman & King 2000; Singha et al. 2000 (cocain users); McDonough & Walters 2001; Armstrong & Khawaja 2002; Jones & Zachariae 2002; Tabenkin et al. 2004; DA Dawson et al. 2005:456	**EUROPE** *Britain*: Crown & Crisp 1966 (mental patients); Crown et al. 1970; Finlay-Jones & Burvill 1977; Crisp et al. 1978b; *Netherlands*: de Graaf et al. 2002:623; *Norway*: Tambs & Moum 1993:366 **MIDDLE EAST** *Israel*: Ben-Zur & Zeidner 1996 **NORTH AMERICA** *United States*: Goodstein & Goldberger 1955 (psychiatric patients); Dupuy et al. 1970; Hogarty & Katz 1971; PJ Bush & Osterweis 1978; Mellinger et al. 1978; RC Kessler & McRae 1981; Mavissakalian & Michelson 1981; Mellinger et al. 1984; JH Boyd 1986; Glassman et al. 1990; RC Kessler et al. 1994a; Pigott 1999 (anxiety disorder)

4.4.6.1d. Stress/Distress/Worry/Anxiety in General (Non-Humans)

The limited research on stress and anxiety in general among non-humans has used various operational definitions. The conclusions with respect to any gender differences have been mixed (Table 4.4.6.1d).

Table 4.4.6.1d. Stress/distress/worry/anxiety in general (non-humans).

Nature of Any Dif-ference					Postpubertal		Multiple Age Categories
						Adult	
Males more							**RODENT** *Mouse*: Voikar et al. 2001 (anxiety); *Rat*: AL Johnston & File 1991 (anxiety); Zimmerberg & Farley 1993 (anxiety)
No signif. difference						**MARSUPIAL** *Gray short-tailed opossum*: Fadem 1995 (screeching when captured)	**RODENT** *Rat*: CK Kellogg et al. 1991; Steenbergen et al. 1991
Females more						**MARSUPIAL** *Gray short-tailed opossum*: Fadem & Corbett 1993a (screeching when captured) **RODENT** *Rat*: Perrot-Sinal et al. 1996 (in a Morris water maze)	

4.4.6.2. Stress/Distress/Worry/Anxiety Associated With Pain

Experiencing pain can certainly lead to stress and anxiety. The limited research on any sex difference in pain-induced stress has not been consistent, possibly due in part to species variations (Table 4.4.6.2).

Table 4.4.6.2. Stress/distress/worry/anxiety associated with pain.

Nature of Any Difference						Postpubertal
						Adult
Males more						**NORTH AMERICA** *Canada*: Frot et al. 2004
No signif. difference						**NORTH AMERICA** *United States*: Fishbain et al. 1986 (patients with chronic pain)
Females more						**RODENT** *Mouse*: Hennessy et al. 1977 (stress due to foot shock)

4.4.6.3. Stress/Distress/Worry/Anxiety Associated With Ill Health

Anxiety associated with ill health was found in one study to be greater in the case of females than males (Table 4.4.6.3).

Table 4.4.6.3. Stress/distress/worry/anxiety associated with ill health.

Nature of Any Difference						Postpubertal
						Adult
Males more						
No signif. difference						
Females more						**NORTH AMERICA** *United States*: DA Dawson et al. 2005:456

4.4.6.4. Stress/Distress/Worry/Anxiety Associated With Medical and Dental Treatment

One study found stress and anxiety linked to dental visitations greater for females than for males (Table 4.4.6.4).

Table 4.4.6.4. Stress/distress/worry/anxiety associated with medical and dental treatment.

Nature of Any Difference						Postpubertal
						Adult
Males more						
No signif. difference						
Females more						**NORTH AMERICA** *United States*: Liddell & Locker 1997 (dentists and dental pain)

4.4.6.5. Stress/Distress/Worry/Anxiety Associated With One's Own Divorce or Marital Discord

The available studies on stress resulting from divorce or marital discord have all concluded that it is greater for women than for men (Table 4.4.6.5).

Table 4.4.6.5. Stress/distress/worry/anxiety associated with divorce or marital discord.

Nature of Any Difference						Postpubertal
						Adult
Males more						
No signif. difference						
Females more						**NORTH AMERICA**: *United States*: Gurin et al. 1960:236 (divorce); Campbell 1974:12 (divorce); Radloff 1975 (divorce); Spreitzer et al. 1975 (divorce); Chiriboga & Dean 1988 (marital stress)

4.4.6.6. Stress/Distress/Worry/Anxiety Associated With Divorce of Parents

Except in adulthood, males have been found to experience greater stress resulting from the divorce (or pending divorce) of their parents than do females. In adulthood, the opposite was found to be the case (Table 4.4.6.6).

Table 4.4.6.6. Stress/distress/worry/anxiety associated with divorce of parents.

Nature of Any Difference	Prepubertal	Postpubertal	
	Early Childhood	Adolescence	Adult
Males more	**NORTH AMERICA** *United States*: EM Heatherington et al. 1971; EM Heatherington et al. 1985 (after parental divorce)	**NORTH AMERICA** *United States*: JH Block et al. 1986 (after parental divorce)	
No signif. difference			
Females more			**NORTH AMERICA** *United States*: Cavan 1932 (young, to broken home conditions)

4.4.6.7. Stress/Distress/Worry/Anxiety Associated With Sex or Sexuality

A couple of studies concluded that women experience greater stress and anxiety than men in regard to sexual matters (Table 4.4.6.7).

Table 4.4.6.7. Stress/distress/worry/anxiety associated with sex or sexuality.

Nature of Any Difference	Postpubertal
	Adult
Males more	
No signif. difference	
Females more	**NORTH AMERICA** *United States*: Lansky et al. 1961 (about sexual matters); Struckman-Johnson 1988 (resulting from being sexually coerced)

4.4.6.8. Stress/Distress/Worry/Anxiety Associated With Non-Sexual Social Matters

Studies of various types of non-sexual social stress and anxiety have reached different conclusions with respect to any possible sex differences (Table 4.4.6.8).

Table 4.4.6.8. Stress/distress/worry/anxiety associated with non-sexual social matters.

Nature of Any Difference	Postpubertal	
	Adolescent	Adult
Males more		**NORTH AMERICA** *Canada*: KM Cramer 2000 (college, social anxiety); *United States*: Lash et al. 1991 (when called upon to express one's emotions)
No signif. difference		**EUROPE** *Sweden*: Lindwall 2004a:237 (college, social anxiety)
Females more	**NORTH AMERICA** *United States*: RB Felson & Trudeau 1991; Rudolph & Hammen 1999* (interpersonal stress)	**EUROPE** *Sweden*: Nystedt & Smari 1989 (social anxiety) **NORTH AMERICA** *Canada*: Leadbeater et al. 1995 (relationships with parents & peers); DA Dawson 2005:456 (social stress)

4.4.6.9. Stress/Distress/Worry/Anxiety Associated With Providing Care to Others

Numerous studies have concluded that women experience more stress and anxiety that is associated with providing care to dependent others – primarily children and the elderly – than do men (Table 4.4.6.9). It should be noted, however, that women are also more likely to provide such care than are men, as discussed in Chapter 9.

Table 4.4.6.9. Stress/distress/worry/anxiety associated with providing care to others.

Nature of Any Difference	Postpubertal
	Adult
Males more	
No signif. difference	
Females more	**NORTH AMERICA** *United States*: CP Cowan et al. 1985 (parental stress); A Horowitz 1985 (caregivers to an ill elderly parent); Wilkie & Ames 1986 (stress associated with parenting); J Scott & Alwin 1989 (stress associated with parenting); RF Young & Kahana 1989 (caring for ill elderly parent); Chang & White-Means 1991 (elderly, caring for ill spouse); Mui 1995 (caring for elderly parent); K Fredriksen 1996 (caring for the elderly); Ingersoll-Dayton et al. 1996 (caring for ill elderly); Laditka & Pappas-Rogich 2001 (caring for dependent others)

4.4.6.10. Stress/Distress/Worry/Anxiety Associated With Sexual Assault/Domestic Violence

All available research has indicated that women are more likely than men to have feelings of stress and anxiety associated with being sexually assaulted or experiencing domestic violence (Table 4.4.6.10).

Table 4.4.6.10. Stress/distress/worry/anxiety associated with sexual assault/domestic violence.

Nature of Any Difference						Postpubertal
						Adult
Males more						
No signif. difference						
Females more						**EUROPE** *Britain*: Graham et al. 2004:389 (domestic violence) **NORTH AMERICA** *United States*: Struckman-Johnson 1988 (college, sexual assault); Struckman-Johnson & Struckman-Johnson 1996 (college, sexual assault); O'Sullivan et al. 1998 (college)

4.4.6.11. Stress/Distress/Worry/Anxiety Associated With Work outside the Home

Studies regarding work-related stress have reached inconsistent conclusions regarding any possible gender differences (Table 4.4.5.11).

Table 4.4.6.11. Stress/distress/worry/anxiety associated with work outside the home.

Nature of Any Difference							Multiple Age Categories
Males more							**EUROPE** *Italy*: Tenconi et al. 1992:767 (stress at work) **NORTH AMERICA** *United States*: Pearlin 1975
No signif. difference							**NORTH AMERICA** *Canada*: M Denton et al. 2004:2592* (job stress)
Females more							**EUROPE** *Ireland*: Hope et al. 1999:316 (stress at work) **NORTH AMERICA** *United States*: Davidson & Cooper 1985; Jick & Mitz 1985; Zappert & Weinstein 1985; D Wiley 1987; PT Bartone & Priest 2001 (military cadets); He et al. 2002 (police officers); DA Dawson et al. 2005:456 (job stress)

4.4.6.12. Stress/Distress/Worry/Anxiety Associated With Finances or Being Unemployed

Studies of stress associated with financial matters or with unemployment have not found a consistent sex difference (Table 4.4.6.12).

Table 4.4.6.12. Stress/distress/worry/anxiety associated with finances or being unemployed.

Nature of Any Difference						Postpubertal	Multiple Age Categories
						Adult	
Males more						**NORTH AMERICA** *Canada*: M Denton et al. 2004:2592 (financial stress); *United States*: RC Kessler & McLeod 1984 (financial stress); B Wheaton 1990 (financial stress); Lahelma 1992 (unemployment) **OCEANIA** *Australia*: Muller et al. 1993 (unemployment)	**NORTH AMERICA** *United States*: Shamir 1986a (unemployment)
No signif. difference						**NORTH AMERICA** *United States*: Winefield & Tiggemann 1985 (unemployment) **OCEANIA** *Australia*: Creed & Macintyre 2001 (unemployment, financial strain); Creed & Watson 2003 (unemployment)	**NORTH AMERICA** *United States*: Feather & O'Brien 1986 (unemployment)
Females more						**NORTH AMERICA** *United States*: PB Warr & Jackson 1985 (unemployment); LE Waters & Moore 2002 (unemployment, financial strain)	

4.4.6.13. Test Anxiety/Anxiety Involving an Academic Subject

Test anxiety refers to unusual feelings of fear and even panic that one is going to do poorly on an exam. The vast majority of studies have found test anxiety to be more common among females than among males (Table 4.4.6.13).

Table 4.4.6.13. Test anxiety/anxiety involving an academic subject.

Nature of Any Difference	Prepubertal	Postpubertal	
	Childhood	Adolescent	Adult
Males more			
No signif. difference	**NORTH AMERICA** *United States*: Feld & Lewis 1969:193* (African-Americans)		**AFRICA** *South Africa*: Mwamwenda 1993 (college) **EUROPE** *Britain*: RM Clarke 1986 (college); Sadler-Smith 1996: 376 (college)
Females more	**NORTH AMERICA** *United States*: Feld & Lewis 1969:193* (Whites); Guida & Ludlow 1989* **OCEANIA** *Australia*: FN Cox & Leaper 1959	**EUROPE** *Britain*: Elwood & Comber 1996 (teacher rated) **NORTH AMERICA** *United States*: BN Phillips 1962 (academic setting); Guida & Ludlow 1989* **OCEANIA** *Australia*: AJ Martin 2003 **INTERNATIONAL** *Multiple Countries*: El-Zahhar 1991:243	**AFRICA** *Egypt*: El-Zahhar 1991* (college); *South Africa*: Mwamwenda 1994 (college) **EUROPE** *Britain*: Siann & French 1975 (college, academic setting); E Clark & Reiker 1986 (college, academic setting); Zeidner 1991 (college); Abouserie 1994 (college in Wales, academic setting); M Martin 1997 (college); *Germany*: Zeidner 1991 (college) **LATIN AMERICA** *Brazil*: El-Zahhar 1991* (college) **NORTH AMERICA** *United States*: RD Bloom 1963 (young); Stroup & Jordan 1982 (college, statistics classes); Hembree 1988 (college); JH Watson 1988 (college); Pintrich & DeGroot 1990 (college, classroom anxiety); CD Miller et al. 1990 (college, academic failure); Royse & Rompf 1992 (college, social work majors in a math class); JT Richardson 1993 (college, academic failure); Onwuegbuzie 1995 (college, statistics classes); Baloglu 2003 (college, statistics classes) **OCEANIA** *Australia*: Watkins 1982a (college, academic failure); Watkins & Hattie 1985 (college, academic failure) **INTERNATIONAL** *Multiple Countries*: Guida & Ludlow 1989; El-Zahhar 1991 (college)

4.4.6.14. Stress/Distress/Worry/Anxiety Associated With Technology

At least two studies have concluded that females experience more anxiety when operating a computer, especially when performing an unfamiliar task, than do males (Table 4.4.6.14).

Table 4.4.6.14. Stress/distress/worry/anxiety associated with technology.

Nature of Any Difference	Post Prepubertal
	Adult
Males more	
No signif. difference	
Females more	**NORTH AMERICA** *United States*: J Todman 2000 (college, computer anxiety); SJ Simon 2001 (computer related anxiety)

4.4.6.15. Stress/Distress/Worry/Anxiety Associated With Taking Risks

One study found that females experience more stress when they are taking risks than is the case for males (Table 4.4.6.15).

Table 4.4.6.15. Stress/distress/worry/anxiety associated with taking risks.

Nature of Any Difference	Postpubertal
	Adolescent
Males more	
No signif. difference	
Females more	**EUROPE** *Netherlands*: Kerr & Vlaminkx 1997 **NORTH AMERICA** *United States*: Kerr & Vlaminkx 1997 (rappelling down a rock face)

4.4.6.16. Stress/Distress/Worry/Anxiety Associated With Legal Issues/Trouble

No significant sex difference was found regarding stress and anxiety felt in relationship to legal issues (Table 4.4.6.16).

Table 4.4.6.16. Stress/distress/worry/anxiety associated with legal issues/trouble.

Nature of Any Difference	Postpubertal
	Adult
Males more	
No signif. difference	**NORTH AMERICA** *United States*: DA Dawson et al. 2005:456
Females more	

4.4.6.17. Stress/Distress/Worry/Anxiety Associated With Physical Disasters

Stress resulting from a natural disaster was found by one study to be greater among females than among males (Table 4.4.5.17).

Table 4.4.6.17. Stress/distress/worry/anxiety associated with physical disasters.

Nature of Any Difference	Postpubertal
	Adult
Males more	
No signif. difference	
Females more	**MIDDLE EAST** *Turkey*: Yilmaz et al. 2005 (traumatized by earthquakes)

4.4.6.18. Anxiety Sensitivity

Anxiety sensitivity is the fear of having anxiety-related sensations that eventually lead to physical or mental illness. Studies have consistently shown that this type of anxiety is more common among females than males (Table 4.4.6.18).

Table 4.4.6.18. Anxiety sensitivity.

Nature of Any Difference	Postpubertal	
	Adolescent	Adult
Males more		
No signif. difference		
Females more	**EUROPE** *Netherlands*: Van Widenfelt et al. 2002 **NORTH AMERICA** *Canada*: TM Walsh et al. 2004:701 (especially concerning physical symptom rather than social symptoms); *United States*: Muris et al. 2001; BJ Deacon et al. 2002	**NORTH AMERICA** *Canada*: SH Stewart et al. 1997; SH Stewart & Baker 1999; *United States*: RA Peterson & Reiss 1992

4.4.6.19. Separation Distress and Anxiety

Multiple studies have concluded that male infants exhibit greater distress than do their female counterparts when separated from their mothers (Table 4.4.6.19).

Table 4.4.6.19. Separation distress and anxiety.

Nature of Any Difference	Prepubertal
	Infant
Males more	**NORTH AMERICA** *United States*: Bowlby 1973 (infant/mother separation); Moss 1974 (infant/mother interaction); S Phillips et al. 1978 (spontaneous activity); Waters 1978 (infant/mother separation)
No signif. difference	
Females more	

4.4.7. Strategies for Coping With Stress

As this section will reveal, two types of coping strategies have been investigated with respect to possible sex differences: problem-focused and emotion-focused.

4.4.7.1. Adopting a Problem-Focused Response to Stress

According to the available research, when they are confronted with stressful situations, males are more likely than females to adopt a problem-focused response (Table 4.4.7.1).

Table 4.4.7.1. Adopting a problem-focused response to stress.

Nature of Any Difference					Postpubertal	
						Adult
Males more						**EUROPE** *Netherlands*: Vingerhoets & Van Heck 1990; *Sweden*: T Muhonen & Torkelson 2001 **NORTH AMERICA** *United States*: Folkman & Lazarus 1980
No signif. difference						
Females more						

4.4.7.2. Adopting an Emotion-Focused Response to Stress

Table 4.4.7.2 indicates that women are more likely then men to adopt emotional responses to stress.

Table 4.4.7.2. Adopting an emotion-focused response to stress.

Nature of Any Difference					Postpubertal	
						Adult
Males more						
No signif. difference						
Females more						**EUROPE** *Netherlands*: Vingerhoets & Van Heck 1990; *Sweden*: T Muhonen & Torkelson 2001 **NORTH AMERICA** *United States*: Folkman & Lazarus 1980

4.4.8. Other Negative Emotions

Below are tables pertaining to studies of a variety of negative emotions besides those already covered.

4.4.8.1. Negative Emotions in General

The display of negative emotions by infants has been investigated in three studies. As shown in Table 4.4.8.1, they have not reached consistent conclusions with regard to a gender difference.

Table 4.4.8.1. Negative emotions in general.

Nature of Any Difference	Prepubertal					
	Infant					
Males more	**NORTH AMERICA** *United States*: Weinberg et al. 1994 (6-month-olds)					
No signif. difference						
Females more	**NORTH AMERICA** *United States*: Shimanoff 1983; Toda & Fogel 1993 (3-6-month-olds)					

4.4.8.2. Boredom Proneness/Susceptibility

Research concerning gender differences in boredom proneness consistently indicates that males are moreprone or susceptible to boredom than females (Table 4.4.8.2).

Table 4.4.8.2. Boredom proneness/susceptibility.

Nature of Any Difference	Prepubertal				Postpubertal		Multiple Age Categories
		Toddler				Adult	
Males more		**NORTH AMERICA** *United States*: McCall & Kagan 1970 (parental assessment)				**ASIA** *Hong Kong*: Sundberg et al. 1991:214* (college) **MIDDLE EAST** *Lebanon*: Sundberg et al. 1991:214* (college) **NORTH AMERICA** *United States*: Farmer & Sundberg 1986 (young); Tolor 1989 (young); Vodanovich & Kass 1990 (young); Sundberg et al. 1991:214* (college); Watt & Blanchard 1994 (young) **OCEANIA** *Australia*: Sundberg et al. 1991:214* (college)	**NORTH AMERICA** *United States*: Zuckerman et al. 1978; Vodanovich & Kass 1990
No signif. difference							
Females more							

4.4.8.3. Contempt, Feelings of

The two studies of a sex difference in feelings of contempt were somewhat inconsistent, with one suggesting that males exhibited contemptuous emotions more than females, while the other study unearthed no significant difference (Table 4.4.8.3).

Table 4.4.8.3. Contempt, feelings of.

Nature of Any Difference	Postpubertal
	Adult
Males more	**NORTH AMERICA** *United States*: Stapley & Haviland 1989
No signif. difference	**NORTH AMERICA** *United States*: Brody 1993
Females more	

4.4.8.4. Guilt, Embarrassment, and Shame, Feelings of

Many studies have sought to determine if feelings of guilt and shame are more common or intense for one sex than for the other. As shown in Table 4.4.8.4, nearly all of these studies have found that, at least beyond adolescence, females experience guilt and shame more than do males. In the case of one study, no sex difference was found in shame and guilt scores using Personal Feelings Questionnaire & Adapted Shame and Guilt Scale, although the Self-Conscious Affect and Attribution Inventory did yield higher guilt scores for females than for males (Harder et al. 1992).

Table 4.4.8.4. Guilt, embarrassment and shame, feelings of.

Nature of Any Difference	Prepubertal		Postpubertal		Multiple Age Categories
	Toddler	Early Childhood	Adolescent	Adult	
Males more					
No signif. difference		**NORTH AMERICA** *United States*: M Lewis et al. 1992		**NORTH AMERICA** *United States*: Harder et al. 1992* (college) **OCEANIA** *Australia*: Brebner 2003:390 (college)	
Females more	**NORTH AMERICA** *United States*: M Lewis et al. 1989		**EUROPE** *Scotland*: Wight et al. 2000 (regrets of having premarital sex) **NORTH AMERICA** *Canada*: Hakstian & Cattell 1975:307; *United States*: JW Adams et al. 1983 (regarding sexual experiences); Stapley & Haviland 1989; Gutek & Koss 1993 (regarding sexual experiences) Bybee 1998:122 (girls feel guilt more)	**EUROPE** *Sweden*: Weinberg et al. 1995:424* (college) **NORTH AMERICA** *Canada*: Wells & Graham 2003 (after engaging in aggression); *United States*: AH Buss & Brock 1963 (young); Wyer et al. 1965 (college, after displaying aggression); CP Smith et al. 1972 (college, academic cheating); Mosher 1979 (regarding sexual matters); Eagley & Steffen 1986 (about aggressive acts); Darling & Davidson 1987; Gonzales 1992; Harder et al. 1992* (college); Vivian & Langhinrichsen-Rohling 1994; Weinberg et al. 1995:424* (college); Tibbetts 1997 (college, academic cheating); ML Bell & Forde 1999; BE Whitley 2001 (college, academic cheating) **INTERNATIONAL** *Multiple Countries*: AH Fischer et al. 2004:90	**NORTH AMERICA** *United States*: Makepeace 1986 (after courtship violence)

4.4.8.5. Homesickness, Feelings of

One study compared male and female college students in terms of feelings of being homesick (i.e., yearning to return home). It found no significant difference (Table 4.4.8.5).

Table 4.4.8.5. Homesickness, feelings of.

Nature of Any Difference	Postpubertal
	Adult
Males more	
No signif. difference	**EUROPE** *Britain*: S Fisher & Hood 1988 (college)
Females more	

4.4.8.6. Hopelessness, Feelings of

One of the two studies of self-reported feelings of hopelessness concluded that the sexes were statistically equal in these feelings, while the other study concluded that females experienced such feelings more than males (Table 4.4.8.6).

Table 4.4.8.6. Hopelessness, feelings of.

Nature of Any Difference	Postpubertal
	Adolescent
Males more	
No signif. difference	**OCEANIA** *Australia*: G Martin et al. 2004:496
Females more	**OCEANIA** *Guam*: Pinhey & Millman 2004:7

4.4.8.7. Hostility, Feelings of

Several studies have sought evidence of gender differences in feelings of hostility. For individuals in general populations, males appear to have these feelings more than do females (Table 4.4.8.7). Only two studies found the opposite. In both cases, the subjects in these studies were drug addicts.

Table 4.4.8.7. Hostility, feelings of.

Nature of Any Difference	Prepubertal	Postpubertal	Multiple Age Categories
	Early Childhood	Adult	
Males higher	**NORTH AMERICA** *United States*: AF Ricketts 1934	**NORTH AMERICA** *United States*: Scherwitz et al. 1991 (young); Engebretson & Matthews 1992; Girdler et al. 1997	**EUROPE** *Finland*: Elovainio et al. 2001:310 **NORTH AMERICA** *United States*: AH Buss & Durkee 1957; Barefoot et al. 1991; Lawler et al. 1993
No signif. difference			
Females higher		**NORTH AMERICA** *United States*: SA Ball 1995 (cocaine addicts, young); Petry & Bickel 2000 (heroin addicts, young)	

4.4.8.8. Loneliness, Feelings of

Feelings of loneliness are usually assessed in terms of responses to questionnaire items. As shown in Table 4.4.8.8, males are usually higher in such feelings than are females.

Table 4.4.8.8. Loneliness, feelings of.

Nature of Any Difference	Prepubertal	Postpubertal		Multiple Age Categories
	Childhood	Adolescent	Adult	
Males more	**NORTH AMERICA** *United States*: Achenbach & Edelbrock 1981:14		**EUROPE** *Britain*: Mellanby et al. 2000:384 (college); *Netherlands*: van Baarsen 2002 (elderly, after death of a spouse) **NORTH AMERICA** *Canada*: Bonin et al. 2000:155; *United States*: L Wheeler et al. 1983; J Schmitt & Kurdek 1985	
No signif. difference				**EUROPE** *Britain*: A Steptoe et al. 2004
Females more		**NORTH AMERICA** *United States*: Medora & Woodward 1986 (college); Ewart & Kolodner 1994		

4.4.9. Positive Emotional Feelings (Positive Mood)

Studies of sex differences with respect to positive emotional feelings or moods are reviewed in this section.

4.4.9.1. Positive Mood (Positive Affect) in General

Table 4.4.9.1 suggests that at least in the United States, males report having positive moods or affect to a greater degree than females.

Table 4.4.9.1. Positive mood (positive affect) in general.

Nature of Any Difference	Prepubertal				Postpubertal		Multiple Age Categories
			Early Childhood	Childhood		Adult	
Males more			**NORTH AMERICA** *United States*: Marcus et al. 1985	**NORTH AMERICA** *United States*: Hurlock 1927 (proud, self-rated); Charlesworth & Dzur 1987		**EUROPE** *Britain*: Bhui & Fletcher 2000 (after exercise) **NORTH AMERICA** *United States*: Aries 1976 (young)	**NORTH AMERICA** *United States*: Kenney & White 1966
No signif. difference							
Females more							

4.4.9.2. Change in Positive Emotions/Mood With Age

Two studies concluded that males increased (or decreased less) in having positive emotions or mood as they aged compared to females (Table 4.4.8.2).

Table 4.4.9.2. Change in positive emotions/mood with age.

Nature of Any Difference	Citations
Males increase more/decrease less	**NORTH AMERICA** *United States*: S Smith 1939 (from ages 8 to 15); Tschechtelin 1945 (through adulthood)
No signif. difference	
Females increase more/decrease less	

4.4.9.3a. Empathy, Feelings of Among Prepubertal Humans

Empathy refers to the tendency to be able to sense and relate to the feelings of others. Most studies of empathy among children have been based on ratings made by teachers and parents. Split-Table 4.4.9.3a suggests that there is either no significant sex difference in empathy among children or that female children empathize more than do males.

Split-Table 4.4.9.3a. Empathy, feelings of among prepubertal humans.

Nature of Any Difference	Prepubertal			
		Toddler	Early Childhood	Childhood
Males more				
No signif. difference			**NORTH AMERICA** *United States*: Feshbach & Feshbach 1969*; Borke 1971*; Gitter at el. 1971*; Hamilton 1973*; Buck 1975; F. Deutsch 1975; Kurdeck & Rodgon 1975*; Levine & Hoffman 1975	**NORTH AMERICA** *United States*: Walton 1936*; Feshbach & Roe 1968; Feshbach & Feshbach 1969*; Fay 1970; Rothenberg 1970; Borke 1971; Gitter et al. 1971; Hebda et al. 1972; Hamilton 1973*; Buck 1975*; Kurdek & Rodgon 1975*
Females more		**NORTH AMERICA** *United States*: Simmers 1971	**NORTH AMERICA** *United States*: Fesbach & Fesbach 1969*; Borke 1973*; Buck 1975*; ML Hoffman & Levine 1976	**NORTH AMERICA** *United States*: Feshbach & Roe 1968; Feshbach & Feshbach 1969*; Fay 1970; Borke 1973*; Eisenberg et al. 1989 (verbally); J Dunn et al. 1991b (young, others feelings and beliefs); Zahn-Waxler et al. 1992; Zahn-Waxler et al. 1992b; Fabes et al. 1993 (verbally, after seeing someone in distress); Roberts & Strayer 1996 (verbally, after watching a film); Strayer & Roberts 1997 (verbally, after watching a film)

4.4.9.3b. Empathy, Feelings of Among Postpubertal Humans

Empathy refers to the tendency to be able to sense and relate to the feelings of others. Various self-report questionnaire items have been used to measure empathy among adolescents and adults. According to Split-Table 4.4.9.3a, nearly all studies of empathy among postpubertal humans have concluded that females exhibit this trait to a greater degree than do males.

Split-Table 4.4.9.3b. Empathy, feelings of among postpubertal humans.

Nature of Any Difference	Postpubertal		Multiple Age Categories
	Adolescent	Adult	
Males more			
No signif. difference	**NORTH AMERICA** *United States*: Walton 1936*	**NORTH AMERICA** *United States*: Walton 1936*	
Females more	**MIDDLE EAST** *Israel*: Karmiol et al. 1998 **NORTH AMERICA** *United States*: GR Adams et al. 1979; RA Hanson 1985; Davis & Franzoi 1991	**EUROPE** *Britain*: Eysenck et al. 1985* (young); Corulla 1987 (young); Corulla 1988 (young); Baron-Cohen & Wheelwright 2004; *Spain*: Luengo et al. 1991:660 (young) **NORTH AMERICA** *United States*: Bartling & Eisenman 1994:73 (young); KD Craig & Lowery 1969 (college); Haan 1974 (young); Holstein 1976 (young); ML Hoffman 1977; Eagly & Steffen 1984; Barnett et al. 1987 (young, rape victims); Brady et al. 1991 (young, rape victims); Kosek 1995 (young); Penner et al. 1995; ME Jones et al. 1998 (college, rape victims); Timmers et al. 1998; Hojat et al. 2001; CP Flynn 2002:141 (college); Hojat et al. 2002 (physicians); Harton & Lyons 2003 (college psychology students)	**EUROPE** *Britain*: SB Eysenck et al. 1985* **NORTH AMERICA** *United States*: Mehrabian & Epstein 1972

4.4.9.4. Joy, Feelings of

One study sought to determine if sex differences exist in general feelings of joy. Among a sample of college students, it concluded that the frequency and intensity of such feelings were greater in females (Table 4.4.9.4).

Table 4.4.9.4. Joy, feelings of.

Nature of Any Difference	Postpubertal
	Adult
Males more	
No signif. difference	
Females more	**OCEANIA** *Australia*: Brebner 2003 (college, frequency & intensity)

4.4.9.5. Love, Feelings of

According to two studies, males fall in love more easily (and with less caution) than do females (Table 4.4.9.5).

Table 4.4.9.5. Love, feelings of.

Nature of Any Difference	Prepubescent	Postpubertal
	Toddler	Adult
More among males	**NORTH AMERICA** *United States*: RP Klein & Durfee 1978 (towards mother)	**NORTH AMERICA** *United States*: Rubin et al. 1981 (romantic love)
No signif. difference		
More among females		

4.4.9.6. Pride, Feelings of

Females have greater overall feelings of pride than do males according to the one located study (Table 4.4.9.6).

Table 4.4.9.6. Pride, feelings of.

Nature of Any Difference	Postpubertal
	Adult
More among males	
No signif. difference	
More among females	**OCEANIA** *Australia*: Brebner 2003:390 (college, frequency & intensity)

4.4.10. Emotional Expressions

Emotional expressions can be produced either intentionally or essentially reflexively. The research on gender differences in these expressions are of varying magnitude and consistency.

4.4.10.1. Emotional Expressiveness in General

Emotional expressiveness can be measured in a variety of ways, ranging from self-reports to observations by others and even via electromyography (EMG) attached to facial muscles. According to most studies, females are more likely than males to exhibit emotional facial expressions, although a minority of studies have failed to find statistically significant gender differences (Table 4.4.10.1). Put another way, the facial expressions of females tend to be more distinct and clearer for others to "read" than are those of males. This conclusion is consistent with a meta-analysis performed by J Hall (1984).

Table 4.4.10.1. Emotional expressiveness in general.

Nature of Any Difference	Prepubertal				Postpubertal		Multiple Age Categories
		Toddler	Early Childhood	Childhood	Adolescent	Adult	
More among males							
No signif. difference						**EUROPE** *Britain*: Wagner 1990 (facial expressions) **NORTH AMERICA** *Canada*: Cupchik & Poulous 1984 (college, facial expressions, self-report); *United States*: Lanzetta et al. 1976 (college, painful shocks, facial expressions); Zuckerman et al. 1976 (college, facial expressions); D Gallagher & Shuntick 1981 (college, nonverbal emotional expressions); Vrana 1993 (college, self-report, facial expressions)	
More among females		**NORTH AMERICA** *United States*: Schachter et al. 1978 (linguistic); J Dunn et al. 1987	**NORTH AMERICA** *United States*: Buck 1977 (facially expressive of their emotions); Brody 1984; Huttenlocher et al. 1991 (linguistic); Zahn-Waxler et al. 1995	**NORTH AMERICA** *Canada*: Strayer & Roberts 1997 (while watching films); *United States*: Morency & Krauss 1982 (while watching films); Yarczower & Daruns 1982 (while watching films); Halberstadt et al. 1993 (while watching films); Shortt et al. 1994 (posing with emotional expressions); Eisenberg et al. 1998 **INTERNATIONAL** *Multiple Countries*: Ollendick et al. 1995	**NORTH AMERICA** *Canada*: Marcotte et al. 1999:39 (among French speaking)	**EUROPE** *Britain*: Wagner et al. 1986 (college); Wagner et al. 1993 (college); *Germany*: Strack et al. 1988 (college, facial expressions); *Poland*: Szarota 1996 (more excitable) **NORTH AMERICA** *United States*: Buck et al. 1972; Buck et al. 1974; Zuckerman et al. 1975 (college); Allen & Haccoun 1976 (college, self-report); Balswick & Avertt 1977 (college, self-report); Frances 1979 (college, facial expressions); Hall 1979 (facial expressions); Zuckerman & Larrance 1979 (self-rated, facially expressive of their emotions); R Buck et al. 1980; Fujita et al. 1980; G Schwartz et al. 1980; Harper et al. 1981; Zuckerman et al. 1981 (college, facial expressions); R Buck et al. 1982 (college, facial expressions); Notarius & Johnson 1982 (among married couples, facial expressions); JA Hall 1984; Riggio & Friedman 1986 (college, facial expressions); Dimberg 1988 (electromyography); Rotter & Rotter 1988; JS Tucker & Riggio 1988; Greenwald et al. 1989 (college, EMG); Dimberg & Lundquist 1990; Mufson & Nowicki 1991 (more accurate at decoding emotional expressions); Wallbott & Scherer 1991; Fridlund et al. 1992 (college, EMG); Gross & Levenson 1993 (college, physiological measures); Grossman & Wood 1993 (college, EMG); P Lang et al. 1993; JS Tucker & Friedman 1993 (college); Fridlund 1994 (self-report, physiological measures, facial expressions); Kring et al. 1994 (self-report); Barr & Kleck 1995 (college, facial expressions); Gross & John 1995 (college, self-report); CE Morris-Prather et al. 1996; McConatha et al. 1997; Gross & John 1998 (college, self-report); Lippa 2005 (college)	**EUROPE** *Poland***:** Szarota et al. 2005:87 (more excitable) **NORTH AMERICA** *United States*: Polce-Lynch et al. 1998

4.4.10.2. Use of Emotional Appeal to Influence Others

One study concluded that women were more likely than men to use emotional appeals to influence others (Table 4.4.10.2).

Table 4.4.10.2. Use of emotional appeal to influence others.

Nature of Any Dif-ference	Postpubertal
	Adult
More among males	
No signif. difference	
More among females	**NORTH AMERICA** *United States*: Fablo et al. 1977

4.4.10.3. Blushing

All of the research located on blushing has failed to find a statistically significant sex difference (Table 4.4.10.3).

Table 4.4.10.3. Blushing.

Nature of Any Dif-ference	Postpubertal
	Adult
Males more	
No signif. difference	**EUROPE** *Britain*: Crozier & Rusell 1992 (young); Edelmann & Skov 1993 (young); **NORTH AMERICA** *United States*: SA Shields et al. 1990 (young); Leary & Meadows 1991 (young); Halberstadt & Green 1993 (young)
Females more	

4.4.10.4. Crying

The circumstances surrounding human tendencies to cry are usually ones of sadness, although extreme joy can also cause crying. As shown in Table 4.4.10.4, most studies have found that females are more likely to cry than males. The only exceptions are in the case of neonates and toddlers, where the findings have been mixed with respect to any gender differences.

Table 4.4.10.4. Crying.

Nature of Any Difference	Prepubertal				Postpubertal
	Infant	Toddler	Early Childhood	Childhood	Adult
Males more	**EUROPE** *Netherlands*: Kohnstamm 1989 (parental rating) **NORTH AMERICA** *United States*: HA Moss 1967:22; Grunau & Craig 1987 (neonate, response to a heel prick); Belsky et al. 1991				
No signif. difference	**NORTH AMERICA** *Canada*: Teichner et al. 1997; *United States*: Kessen et al. 1961 (neonate); H Caldwell & Leeper 1974; Overgaard & Knutsen 1999 (neonate, response to a heel prick); Vingerhoets & Scheirs 2000	**EUROPE** *Britain*: Vingerhoets & Scheirs 2000			
Females more	**NORTH AMERICA** *United States*: Goldberg & Lewis 1969* (in response to others crying); Simmers 1971 (in response to others crying); Sagi & Hoffman 1976 (in response to others crying); Feldman et al. 1980		**NORTH AMERICA** *United States*: Dawe 1934	**NORTH AMERICA** *United States*: Schecter et al. 1991 (response to pain); Fearon et al. 1996 (response to pain); Bournaki 1997 (response to receiving a shot)	**AFRICA** *South Africa*: SG Lee 1969 (Zulu tribe, "crying fits") **EUROPE** *Britain*: DG Williams & Morris 1996* **MIDDLE EAST** *Israel*: DG Williams & Morris 1996* **NORTH AMERICA** *United States*: Hammen & Padesky 1977 (depressed patients); W Frost & Averill 1982 (when angry); Lombardo et al. 1983 (college); M Barnes & Buss 1985 (married); Frey 1985; Choti et al. 1987 (college); Carroll & Shaefer 1994 (due to death of a child); Luthar et al. 1996:182 (opiate addicts, retrospective childhood recollections) **INTERNATIONAL** *Multiple Countries*: AH Fischer et al. 2004:91

4.4.10.5. Expressions of Anger/Threats

The research on gender differences in the expression of anger generally suggests that males are more prone to do so than are females (Table 4.4.10.5). Among adults, this seems to be especially so when males are attempting to exercise control over a social situation. Adult females, on the other hand, have been found to express anger more often than males when they seem to have lost control over a social situation. Thus, the expression of anger among adults seems to be more instrumental among males, whereas it is more expressive among females.

Table 4.4.10.5. Expressions of anger/threats.

Nature of Any Difference	Prepubertal				Postpubertal	
	Infants	Toddler	Early Childhood	Childhood	Adolescent	Adult
Males more	**NORTH AMERICA** *United States*: Stenberg et al. 1983 (facial expressions, 7 months of age)	**NORTH AMERICA** *United States*: Emde et al. 2001 (parent-rated)	**NORTH AMERICA** *United States*: Einon & Potegal 1994 (facial expressions)	**NORTH AMERICA** *United States*: Fabes & Eisenberg 1992; BK Bryant 1992 (teacher rated); MB Jones et al. 1992; Buntaine & Costenbader 1997 (self-report); JA Hubbard 2001 (Blacks, during play)	**NORTH AMERICA** *United States*: MB Jones et al. 1992	**ASIA** *India*: Iqbal & Ahmad 1993 (outward towards others); *Japan*: Cocroft & Ting-Toomey 1994* (face threats U.S. & Japan); Ramierez et al. 2001* (in trying to seize control of a situation) **EUROPE** *Britain*: A Campbell & Muncer 1994 (in trying to seize control of a situation); Astin et al. 2003* (in trying to seize control of a situation); *Spain*: Ramiererz et al. 2001* (in trying to seize control of a situation); *Netherlands*: Evers et al. 2005 (in social situations) **MIDDLE EAST** *India*: Iqbal & Ahmad 1993* (overtly expressed anger) **NORTH AMERICA** *United States*: JG Allen & Hacconn 1976 (young); R Buck 1979 (act on anger); Coats & Feldman1996 (act on); Biaggio 1980 (self-report); Doyle & Biaggio 1981 (self-report); Rotter & Rotter 1988; Cocoft & Ting-Toomey 1994* (face threats U.S. & Japan); Timmers et al. 1998* (toward the offending person); Zeichner et al. 2003; Deffenbacher et al. 1996
No signif. difference	**NORTH AMERICA** *United States*: Stifter & Grant 1993	**EUROPE** *Britain*: Blurton Jones & Konner 1973*	**EUROPE** *Britain*: Blurton Jones & Konner 1973*			**NORTH AMERICA** *United States*: Averill 1982 (self-report); Rotter & Rotter 1988 (college, facial expressions); Fischer 1993
Females more	**NORTH AMERICA** *United States*: Stenberg & Campos 1990 (facial expressions, 4 months of age)					**ASIA** *India*: Iqbal & Ahmad 1993 (inward towards self); *Japan*: Ramierez et al. 2001* (lose self-control) **EUROPE** *Britain*: Wagner et al. 1986 (facial expressions); Astin et al. 2003* (lose self-control); *Spain*: Ramiererz et al. 2001* (lose self-control) **NORTH AMERICA** *United States*: Zuckerman et al. 1975 (college, facial expressions); Allen & Haccoun 1976 (college, self-report); Schwartz et al. 1980 (college, facial expressions); Frost & Averill 1982 (verbal expression); Dosser et al. 1983 (verbal expression); Spielberger et al. 1985 (verbal expression); Burrowes & Halberstadt 1987 (verbal expression); SP Thomas 1989; Brody 1993 (verbal expression); McConatha et al. 1994 (verbal expression); Stoney & Engebretson 1994 (verbal expression); Timmers et al. 1998* (expressing anger to a third party)

4.4.10.6. Expressions of Disgust

The available findings on sex differences in exhibiting expressions of disgust have all concluded that females do so more than males (Table 4.4.10.6).

Table 4.4.10.6. Expressions of disgust.

Nature of Any Difference	Postpubertal
	Adult
Males more	
No signif. difference	
Females more	**EUROPE** *Britain*: Wagner et al. 1993 (facial expressions); Wagner et al. 1986 (facial expressions) **NORTH AMERICA** *United States*: Zuckerman et al. 1975 (college, facial expressions); Fujita et al. 1980 (facial expressions); Tucker & Riggio 1988 (college, facial expressions); Rotter & Rotter 1988 (college, facial expressions); Larkin et al. 2002 (decode expression of disgust)

4.4.10.7. Expressions of Fear

According to several studies, females exhibit expressions of fear more often than do males (Table 4.4.10.7).

Table 4.4.10.7. Expressions of fear.

Nature of Any Difference	Postpubertal
	Adult
Males more	
No signif. difference	
Females more	**EUROPE** *Britain*: Wagner et al. 1993 (facial expressions) **NORTH AMERICA** *United States*: Zuckerman et al. 1975 (college, facial expressions); Allen & Haccoun 1976 (college, self-report); Schwartz et al. 1980 (college, facial expressions); Rotter & Rotter 1988 (college, facial expressions)

4.4.10.8. Expressions of Happiness and Laughter

Most, but not all, studies have concluded that females exhibit more expressions of happiness or that they laugh more often than do males (Table 4.4.10.8).

Table 4.4.10.8. Expressions of happiness and laughter.

Nature of Any Difference	Sub-Adolescent	Postpubertal	
	Childhood	Adolescence	Adult
Males more		**NORTH AMERICA** *United States*: Provine 1993* (observed in naturalistic settings)	**NORTH AMERICA** *United States*: Provine 1993* (observed in naturalistic settings)
No signif. difference			**EUROPE** *Britain*: Wagner et al. 1986 (happiness, facial expressions)
Females more	**EUROPE** *Britain*: Chapman 1973 (facial expressions) **NORTH AMERICA** *United States*: Yarczower & Daruns 1982 (facial expressions); McCloskey & Coleman 1992:253 (laughing during same-sex play)		**NORTH AMERICA** *Canada*: U Hess et al. 1997 (college, intense expressions of happiness); Balswick & Avertt 1977 (college, self-report); Frances 1979 (college, facial expressions); Fujita et al. 1980 (adult, facial expressions); Halberstadt et al. 1988 (college, facial expressions); Tucker & Riggio 1988 (happiness; college facial expression); Provine 1993 (as conversational punctuation); Barr & Kleck 1995 (happiness, college, facial expression); M Chapell et al. 2002 (in public gatherings)

4.4.10.9. Laughing at (or Enjoying) Jokes or Cartoons

All of the available research indicates that males are more prone to laugh at jokes and cartoons, and to do so with greater gusto, than females (Table 4.4.10.9).

Table 4.4.10.9. Laughing at (or enjoying) jokes or cartoons.

Nature of Any Difference	Prepubertal	Postpubertal	
	Early Childhood	Adolescent	Adult
Males more	**NORTH AMERICA** *United States*: Hattwick 1937	**NORTH AMERICA** *United States*: Kuhlen & Lee 1943 (enjoying jokes)	**NORTH AMERICA** *United States*: AJ Chapman & Gadfield 1976 (young, enjoying sexist humor); Neuliep 1987 (young, enjoying dirty/sexual humor); AM Love & Deckers 1989 (young, enjoying dirty/sexual humor); KM Ryan & Kanjorski 1998 (young, enjoying sexist humor); Bachorowski et al. 2001 (college)
No signif. difference			
Females more			

4.4.10.10. Expressions of Pride

One study indicated that males were more likely to express feelings of pride than females (Table 4.4.10.10).

Table 4.4.10.10. Expression of pride.

Nature of Any Difference	Postpubertal
	Adult
Males more	**NORTH AMERICA** *United States*: Brody & Hall 1993
No signif. difference	
Females more	

4.4.10.11. Expressions of Sadness/Disappointment

Studies on the expression of sadness/disappointment show that prepubertally males express these emotions more. Postpubertally, there was either no difference or females expressed sadness/disappointment more than males (Table 4.4.10.11).

Table 4.4.10.11. Expression of sadness/disappointment.

Nature of Any Difference	Prepubertal		Postpubertal
	Early Childhood	Childhood	Adult
Males more	**NORTH AMERICA** *United States*: TL Davis 1995*	**NORTH AMERICA** *United States*: TL Davis 1995* (school age, when given an unattractive gift)	
No signif. difference			**NORTH AMERICA** *United States*: Tucker & Riggio 1988 (college, facial expression)
Females more			**NORTH AMERICA** *United States*: Zuckerman et al. 1975 (college students, facial expressions); Allen & Haccoun 1976 (college, self-report); Balswick & Avertt 1977 (college, self-report); Fujita et al. 1980 (facial expressions); Schwartz et al. 1980 (college, facial EMG); Rotter & Rotter 1988 (college, facial expressions)

4.4.10.12. Facial Expressions During Competition

According to one study, no significant sex difference was found in the expressions exhibited by children when they were engaged in a competitive task (Table 4.4.10.12).

Table 4.4.10.12. Facial expressions during competition.

Nature of Any Difference	Prepubertal
	Childhood
Males more	
No signif. difference	**NORTH AMERICA** *United States*: MK Underwood et al. 1999 (lab experiment)
Females more	

4.4.10.13. Facial Expressions in Response to Emotion-Provoking Stimuli

Nearly all of the relevant studies suggest that females are more inclined to exhibit facial expressions in response to emotion-provoking stimuli than are males (Table 4.4.10.13).

Table 4.4.10.13. Facial expressions in response to emotion-provoking stimuli.

Nature of Any Difference	Postpubertal		Multiple Age Categories
	Adolescent	Adult	
Males more		**NORTH AMERICA** *United States*: DF Thompson & Meltzer 1964 (young, facial communication of emotional)	
No signif. difference			
Females more	**NORTH AMERICA** *United States*: Meltzer 1943; JM McDermott et al. 1983	**EUROPE** *Britain*: HL Wagner et al. 1986 (young); *Sweden*: Dimburg 1990 (young); Dimberg & Lundquist 1990 (young); Thunberg & Dimberg 2000 (young) **NORTH AMERICA** *United States*: R Buck et al. 1972 (young); Bem et al. 1976 (sympathy, toward a lonely person); GE Schwartz et al. 1976a (facial electro myocardiograms); GE Schwartz et al. 1976b (facial electro myocardiograms); GE Schwartz et al. 1978 (facial electro myocardiograms); GE Schwartz et al. 1979 (facial electro myocardiograms); Fujita et al. 1980 (young); GE Schwartz et al. 1980* (facial electro myocardiograms); Dimberg 1988; Malatesta et al. 1989; Katsikitis et al. 1997 (young)	**NORTH AMERICA** *United States*: Schwartz et al. 1980*

4.4.10.14. Facial Expressions in Response to Surprise-Provoking Stimuli

Nearly all of the relevant studies suggest that females are more inclined to exhibit facial expressions in response to surprise-provoking stimuli than are males (Table 4.4.10.14).

Table 4.4.10.14. Facial expressions in response to surprise-provoking stimuli.

Nature of Any Difference	Postpubertal
	Adult
Males more	
No signif. difference	
Females more	**EUROPE** *Britain*: HL Wagner et al. 1986 **NORTH AMERICA** *United States*: Zuckerman et al. 1975 (college); Fujita et al. 1980

4.4.10.15. Age of Onset of Smiling

One study was undertaken to determine if infant boys or infant girls exhibited smiling at an earlier average age. No significant difference was found (Table 4.4.10.15).

Table 4.4.10.15. Age of onset of smiling.

Nature of Any Difference	Prepubertal
	Infant
Males more	
No signif. difference	**EUROPE** *Hungary*: Nagy et al. 2001:190 (rated by mothers)
Females more	

4.4.10.16. Sulking

According to the limited research that was located, sulking is more characteristic of females than of males (Table 4.4.10.16).

Table 4.4.10.16. Sulking.

Nature of Any Difference	Prepubertal	Postpubertal
	Childhood	Adolescent
Males more		
No signif. difference		
Females more	**NORTH AMERICA** *United States*: Bjorkqvist et al. 1992	**NORTH AMERICA** *United States*: Lagerspetz et al. 1988 (young)

4.4.10.17. Tantrums

In the case of people throwing tantrums, studies that have found a significant sex difference that has indicated that such behavior is more common among males than among females (Table 4.4.10.17).

Table 4.4.10.17. Tantrums.

Nature of Any Difference	Prepubertal		Multiple Age Categories
	Toddler	Childhood	
Males more	**NORTH AMERICA** *United States*: MacFarlane et al. 1954	**NORTH AMERICA** *United States*: S Jenkins et al. 1984 (young); Einon & Potegal 1994 (young)	
No signif. difference	**NORTH AMERICA** *United States*: Einon & Potegal 1994; Potegal & Davidson 2003		**NORTH AMERICA** *United States*: JJ Michaels & Goodman 1934 (ages 6-16)
Females more			

4.4.10.18. Angry Responses to Aggression

The tendency to feel angry in response to others exhibiting acts of aggression was found to be more common in males than in females (Table 4.4.10.18).

Table 4.4.10.18. Angry responses to aggression.

Nature of Any Difference	Prepubertal	Postpubertal
	Childhood	Adolescent
Males more	**NORTH AMERICA** *United States*: DL Clay et al. 1996*	**NORTH AMERICA** *United States*: DL Clay et al. 1996*
No signif. difference		
Females more		

Chapter 5

INTELLECTUAL, COGNITIVE, SELF-CONCEPT, AND MENTAL HEALTH/ILLNESS FACTORS

Among the functioning consequences of human brain activity are thoughts and ideas. In this chapter, thought processes are subsumed under four broad categories: intelligence, cognition, self-concepts, and mental health/illness. Readers will see that a tremendous amount of behavioral and social science research has investigated gender differences in each of these mental processes.

5.1

ACADEMIC FACTORS

As a major expression of intellectual abilities, academic factors are those having to do with performance in educational institutions, with a particular focus on grades or scores on standardized tests of knowledge in various academic subject areas.

5.1.1. General Academic Factors

The gender differences considered under academic factors in general mainly have to do with grades given by teachers, but also include self-ratings of academic ability as well as whether one is passed on to higher grade levels or drops out of school entirely.

5.1.1.1. Academic Performance, GPA, Grades in General

Many studies have compared males and females with respect to grades they obtain. Grades for specific types of courses will be considered in subsequent tables, but Table 5.1.1.1 pertains to grades overall and grade point averages (GPAs). As one can see, the findings are somewhat mixed but generally indicate that females receive higher grades than do males from primary school through college, particularly during adolescence. This does not seem to provide support for the assertion that girls often intentionally attempt to get lower grades in school than boys (Huebner & Betts 2002:128).

Table 5.1.1.1. Academic performance, GPA, grades in general.

Nature of Any Difference	Prepubertal				Postpubertal	
				Childhood	Adolescent	Adult
Higher for males				**NORTH AMERICA** *United States*: Frailey & Gain 1914* (grades); Pyle 1924*; Commins 1928*	**NORTH AMERICA** *United States*: Pyle 1924*; Commins 1928*	**EUROPE** *Britain*: J Smith & Naylor 2001 (Oxford, college); Surtees et al. 2002 (Cambridge, college); *Ireland*: Lynn 1996 **NORTH AMERICA** *United States*: Bankston & Zhou 1995 (college, descendants of Vietnamese immigrants)
No signif. difference				**EUROPE** *Greece*: Hopf & Hatzichristou 1999:9 **NORTH AMERICA** *United States*: Winsor 1927*; Crandall et al. 1965b*	**EUROPE** *Britain*: Arnot et al. 1998* (HS students, South Asians); *Spain*: Colom et al. 2000 **NORTH AMERICA** *United States*: Frasier 1919 (grades); Winsor 1927*; JW Young 1991	**EUROPE** *Germany*: Abele 2003:770 (college) **NORTH AMERICA** *United States*: JL Buck 1985 (college)
Higher for females				**EUROPE** *Britain*: Wisenthal 1965; Arnot et al. 1998 **NORTH AMERICA** *Canada*: Pagani et al. 2001; *United States*: Miles 1910*; Baldwin 1913; Frailey & Gain 1914*; Lentz 1929; C Swenson 1943; RS Carter 1952; Yates & Pidgeon 1957; Klausmeier 1958; RD Norman et al. 1962; BN Phillips 1962*; RL Spaulding 1963; PS Sears & Feldman 1966*; RD Arnold 1968; W Meyer & Thompson 1970; J Roberts & Baird 1972:4 (T); BA Jacob 2002:592; Pomerantz et al. 2002:399 **INTERNATIONAL** *Several Industrial Countries*: Stetsenko et al. 2000:524	**ASIA** *Taiwan*: Fan & Li 2005* **EUROPE** *Britain*: Younger & Warrington 1996; Arnot et al. 1998* (HS students, Whites); *Scotland*: E Turner et al. 1995; Tinklin et al. 2001 (HS students); *Spain*: Suris & Parera 2005:486 **LATIN AMERICA** *Jamaica*: E Miller 1991; H Evans 1999 **NORTH AMERICA** *United States*: Miles 1910*; Book 1922; Colvin & MacPhail 1924; Touton 1924; Douglass & Olson 1937; Heimann & Schenk 1954; Terman & Tyler 1954; Northby 1958; E Hanson 1959; JS Coleman 1961; BN Phillips 1962*; JC Flanagan et al. 1964; Crandall et al. 1965b*; Lavin 1965; MC Shaw & White 1965 (IQ controlled); PS Sears & Feldman 1966*; RJ Wright & Bean 1974:279; MM Marini 1978:494; Locksley & Douvan 1979:87; Eccles 1984:118; Eccles et al. 1984; McCornak & McLeod 1988 (young, GPA); L Weis 1990; Bornstein & Kennedy 1994; Wright & Houck 1995; Bridgeman & Lewis 1996; Radziszewska et al. 1996; Battle 1997 (African-Americans, junior high school); Silliker & Quirk 1997:290; Inoue 1999; McNabb et al. 2002; Pomerantz et al. 2002; Burrow et al. 2004:277; J Klein 2004 (sex of teacher does not matter) **OCEANIA** *Australia*: Martino 1999; HW Marsh & Yeung 1998; Collins et al. 2000	**ASIA** *Taiwan*: Fan & Li 2005* **EUROPE** *Britain*: McNabb et al. 2002 (college); *Holland*: Heymans 1910 (college) **NORTH AMERICA** *Canada*: RE Rob & Robb 1999 (young); *United States*: Forsyth 1912 (college); Cunningham 1921 (college); Crawford 1926 (college); Gowen & Gooch 1926 (college); Paterson & Langlie 1926 (college); Summerskill & Darling 1955 (college); RF Priest & Houston 1977 (army recruits); DE Olds & Shaver 1980:331 (college); CI Brooks 1987 (college); M Linn 1992 (college); Astin 1993 (college); Tsui 1998:368 (college); Caldas & Bankston 1999:51 (college); Mau & Lynn 2001 (college); Stricker et al. 2001 (college, self-reported academic achievement students applying for graduate school)

5.1.1.2. Academic Performance Under Competitive Conditions

One study compared males and females regarding how well they performed academically under competitive conditions. Using two age groups, the study concluded that males out-performed females when they were encouraged to compete for grades (Table 5.1.1.2).

Table 5.1.1.2. Academic performance under competitive conditions.

Nature of Any Difference	Prepubertal				Postpubertal	
				Childhood	Adolescent	
Males more				**NORTH AMERICA** *United States*: Mischel 1966*	**NORTH AMERICA** *United States*: Mischel 1966*	
No signif. difference						
Females more						

5.1.1.3. Correlation Between Grades and IQ Scores

A limited amount of research has sought to determine if the positive correlation between an individual's grades and his/her scores on IQ tests are stronger for one sex or the other. Most of the findings point toward no sex differences in this regard (Table 5.1.1.3).

Table 5.1.1.3. Correlation between grades and IQ scores.

Nature of Any Difference	Prepubertal	Postpubertal
	Childhood	Adolescent
Males more		
No signif. difference	**NORTH AMERICA** *United States*: Rundquist 1941*	**NORTH AMERICA** *United States*: Wright & Houck 1995
Females more		**NORTH AMERICA** *United States*: Rundquist 1941*

5.1.1.4. Grades Earned, Individual Variability in

The couple of studies that have examined variability in grades have both concluded that males exhibit greater variability than do females. In other words, a male is more likely to receive both extremely high and low grades for courses he takes, whereas the grades obtained by a female are all relatively more similar to one another (Table 5.1.1.4).

Table 5.1.1.4. Grades earned, individual variability in.

Nature of Any Difference	Postpubertal	
	Adolescent	Adult
Males more	**NORTH AMERICA** *United States*: JS Coleman 1961 (within individual) **OCEANIA** *Australia*: Senior Secondary Assessment Board 1993 (in math)	**EUROPE** *Britain*: McNabb et al. 2002:482 (college)
No signif. difference		
Females more	**OCEANIA** *Australia*: MacCann 1995 (closer to class average)	

5.1.1.5. Grades/Scores on Multiple-Choice Tests

In several studies, males have been found to perform better than females on multiple-choice tests (Table 5.1.1.5).

Table 5.1.1.5. Grades/scores on multiple-choice tests.

Nature of Any Difference	Postpubertal
	Adolescent
Males more	**EUROPE** *Britain*: Harding 1981 **NORTH AMERICA** *United States*: Breland & Griswold 1982 (English language); Pomplun et al. 1992 (English subject matter); Breland et al. 1994 (history); Langer et al. 1995 (reading comprehension)
No signif. difference	
Females more	

5.1.1.6. Relationship Between Grades and Academic Procrastination

One study concluded that procrastination with respect to keeping up on homework was more strongly associated with grades among females than among males (Table 5.1.1.6).

Table 5.1.1.6. Relationship between grades and academic procrastination.

Nature of Any Difference	Postpubertal
	Adolescent
Males more	
No signif. difference	
Females more	**OCEANIA** *Australia*: AM Owens & Newbegin 2000

5.1.1.7. Self-Rated Academic Ability

Most studies indicate that males on average rate their overall academic ability as being higher than females' academic ability (Table 5.1.1.7). This gender difference is rather surprising given that most studies show that females earn higher grades than do males (see Table 5.1.1.1). The only instances in which females will sometimes give their academic abilities ratings that are equal to those of males are in areas that are traditionally considered "feminine" or at least gender "neutral", such as in language subject areas.

Table 5.1.1.7. Self-rated academic ability.

Nature of Any Difference	Prepubertal	Postpubertal	
	Childhood	Adolescent	Adult
Males higher	**NORTH AMERICA** *United States*: KT Hill & Dusek 1969* (before feedback); Motanelli & Hill 1969; AH Stein et al. 1971* (masculine task); Nicholls 1975	**NORTH AMERICA** *United States*: Eccles 1984:115 (math)	**NORTH AMERICA** *United States*: Rychlak & Eacker 1962 (college); Rychlak & Lerner 1965 (young); Feather 1969b (college); LI Jacobson et al. 1970 (college); Leventhal & Lane 1970 (college); Schwartz & Clausen 1970 (young); Feather & Simon 1971 (college); Feather & Simon 1972 (college); Benton 1973 (young); Feather & Simon 1973 (college); Feldman-Summers & Kiesler 1974 (college); House 1974* (college, when competing against females); House & Perney 1974 (college); Vollmer 1986 (college); Cranston & Leonard 1990 (college); Stake 1992 (college)
No signif. difference	**NORTH AMERICA** *United States*: KT Hill & Dusek 1969* (after feedback); AH Stein 1971*; AH Stein et al. 1971* (feminine & neutral tasks)	**NORTH AMERICA** *United States*: AH Stein 1971*; HW Marsh et al. 1985a; Wright & Houck 1995 (underestimating performance on tests)	**NORTH AMERICA** *United States*: Simon & Feather 1973 (college); House 1974* (college, when working alone); DM Zuckerman 1989 (college)
Females higher		**EUROPE** *Norway*: Storvoll & Wichstrom 2002:189	

5.1.1.8. Repeating (Not Passing) a Grade in School

All of the relevant research has concluded that males are more likely to repeat grades than are females. This research has been confined to the study of children and adults with recollections of primary school grades (Table 5.1.1.8).

Table 5.1.1.8. Repeating (not passing) a grade in school.

Nature of Any Difference	Prepubertal	Postpubertal
	Childhood	Adult
Males more	**NORTH AMERICA** *Canada*: Masse & Tremblay 1999; Pagani et al. 2001:300; *United States*: Dobbs & Neville 1967; Abidin et al. 1971; J Roberts & Baird 1972; K Alexander et al. 1994; Jimerson et al. 1997:13; Zill et al. 1997; LA Shepard 1997; McCoy & Reynolds 1999; BA Jacob 2002:592	**NORTH AMERICA** *United States*: Luthar et at. 1996:182 (opiate addicts, retrospective childhood recollections)
No signif. difference		
Females more		

5.1.1.9. Grades on Essay Tests

According to one study, females obtained better grades than males did on essay exams (Table 5.1.1.9).

Table 5.1.1.9. Grades on essay tests.

Nature of Any Difference	Postpubertal
	Adolescent
Males better	
No signif. difference	
Females better	**EUROPE** *Britain*: Harding 1981

5.1.1.10. Dropping Out of School

Except for one study of school age children in China (where education for males traditionally has been emphasized over that of females), the research suggests that males are more likely than females to drop out of school before graduating (Table 5.1.1.10).

Table 5.1.1.10. Dropping out of school.

Nature of Any Difference	Prepubertal	Postpubertal
	Childhood	Adolescent
Males more		**NORTH AMERICA** *United States*: Hollingshead 1949:472; Fagan & Pabon 1990:325 **OCEANIA** *New Zealand*: Department of Education in New Zealand 1987; Miech et al. 1999:1117
No signif. difference		
Females more	**ASIA** *China*: Yu & Sarri 1997	

5.1.1.11. Learning Disabilities/Difficulties in General

Individuals who exhibit special learning disabilities are more likely to be males than females, according to all relevant research (Table 5.1.1.11).

Table 5.1.1.11. Learning disabilities/difficulties in general.

Nature of Any Difference	Prepubertal		Postpubertal
	Early Childhood	Childhood	Adolescent
Males more	**NORTH AMERICA** *United States*: Yedinack 1949 (language)	**EUROPE** *Britain*: Rutter & Mawhood 1991(speech & language); *Greece*: Hopf & Hatzichristou 1999:9 **NORTH AMERICA** *United States*: Bentzen 1963 (learning & behavior disorders); Bentzen 1966; Bannatyne 1971 (language & learning); Koppitz 1971; Biller 1974 (reading); C Lewis et al. 1994 (arithmetic); Liederman & Flannery 1995; BA Jacob 2002:592 (in remedial classes)	**EUROPE** *Germany*: Kirkcaldy et al. 2003:54 (self-rated, academic problems)
No signif. difference			
Females more			

5.1.1.12. Academic Test Scores Other Than Those Used for College Admissions

Tests used for assessing academic achievement other than those employed for college admissions are usually administered to students in order to assess the quality of teaching they are receiving. As shown in Table 5.1.1.12, results from these studies are mixed, although as age increases, there is a general tendency for males to receive higher scores than females, especially in tests focusing on math ability.

Table 5.1.1.12. Academic test scores other than those used for college admissions.

Nature of Any Difference	Prepubertal	Postpubertal	
	Childhood	Adolescent	Adult
Males better			**AFRICA** *Multiple Countries*: Cherian & Siweya 1996 (college, math majors) **EUROPE** *Britain*: RJL Murphy 1982 (college); R Lynn & Irwing 2002 (college); R Lynn et al. 2002 (college) **NORTH AMERICA** *United States*: Breland & Griswold 1982 (college); Bolger & Kellaghan 1990 (college); PJ Taylor et al. 1996; KR Bowen et al. 2000
No signif. difference	**NORTH AMERICA** *United States*: BT Baldwin 1928; Heilman 1933 (SAT, ten yr. olds)		
Females better	**NORTH AMERICA** *United States*: Traxler & Spaulding 1954	**OCEANIA** *New Zealand*: DM Fergusson & Horwood 1997:87	

5.1.1.13. College Admissions Exam Scores

Large numbers of studies have sought to determine if a sex difference exists with respect to scores on standardized college admissions exams. The most widely used standardized tests are the Scholastic Achievement Test (SAT) and the American College Test (ACT). All such tests explicitly recognize at least two subcomponents in academic achievement, one bearing primarily on language (or verbal) comprehension and the other pertaining to mathematics and other largely non-language intellectual skills.

Table 5.1.1.13 summarizes the findings from the available research on gender differences in scores on these exams. Overall, they have consistently found that males surpass females on the mathematics components of college admissions tests, but that the results have been very mixed in the case of the linguistic or verbal components. Caveats include the fact that different proportions of males and females apply to various types of colleges, which can sometimes skew the findings in favor of one or the other gender.

Table 5.1.1.13. College admissions exam scores.

Nature of Any Difference	Postpubertal		Multiple Age Categories
	Adolescent	Adult	
Males higher	**EUROPE** *Britain*: Department of Education and Science 1981 (general certificate of education exam); Goodhart 1988; S Clarke 1988; Mar-Molinero 1991; McCrum 1991; *Sweden*: Koivula et al. 2001* (SAT math subtest) **NORTH AMERICA** *United States*: Fishman 1957 (SAT-V); Angoff 1971:83* (SAT-M); Cross 1971 (SAT, ACT); Educational Testing Service 1972 (GRE); Benbow & Stanley 1980 (SAT-M); Benbow & Stanley 1982* (high school, SAT-M); Benbow & Stanley 1983a (SAT-M); Raymond & Benbow 1986 (SAT-M); NW Burton et al. 1988 (SAT-M); S Gross 1988 (math); KL Moss 1990 (SAT); JR Campbell 1991 (SAT-M); Benbow & Lubinski 1993 (SAT-M); Mau & Lynn 2001 (SAT, ACT); BA Jacob 2002:594* (SAT-M)	**MIDDLE EAST** *Israel*: R Azen et al. 2002 (SAT, young) **NORTH AMERICA** *United States*: RJ Wright & Bean 1974:279* (SAT-M); Benbow & Stanley 1982* (college, SAT-M); MJ Clark & Grandy 1984 (young, SAT); McCornak & McLeod 1988 (young, SAT-V, SAT-M); Rigol et al. 1989 (young); P Rosser 1989 (college, SAT); Willingham et al. 1990:74 (young); Stricker et al. 1991 (young, SAT); Wainer & Steinberg 1991 (young, SAT-M); Bridgeman & Lewis 1996 (young, SAT-M); Blau 1998 (young); Tsui 1998:368 (college); Kronholz 1999 (SAT); Leonard & Jiang 1999 (young, SAT); Lubinski et al. 2001b* (SAT-M, gifted students)	**NORTH AMERICA** *United States*: Feingold 1992b* (SAT, general, mechanical, qualitative)
No signif. difference	**EUROPE** *Sweden*: Koivula et al. 2001* (SAT language subtest) **NORTH AMERICA** *United States*: NW Burton et al. 1988 (SAT-V); A Feingold 1988b (SAT-V); BA Jacob 2002:594* (SAT-V)	**NORTH AMERICA** *United States*: E Marks 1968 (young); CA Carroll & Garavulia 2002 (graduate students in pharmacy)	**NORTH AMERICA** *United States*: Feingold 1992b* (SAT-V)
Females higher	**NORTH AMERICA** *United States*: Angoff 1971:83* (SAT-V)	**NORTH AMERICA** *United States*: RJ Wright & Bean 1974:279* (SAT-V); Lubinski et al. 2001b* (SAT-V, gifted students)	

5.1.1.14. College Exit Score

Cambridge University and Oxford University are rather unique in terms of requiring all graduating students who wish to receive a “first class degree” to take a final exit examination and receive a passing score. The available research on recipients of first class degrees at one or both of these institutions has concluded that males have obtained higher average scores than females (Table 5.1.1.14).

Table 5.1.1.14. College exit score.

Nature of Any Difference	Postpubertal
	Adult
Males score higher	**EUROPE** *Britain*: Rudd 1984; McCrum 1994; M Martin 1997; McCrum 1997; Mellanby et al. 2000
No signif. difference	
Females score higher	

5.1.1.15. Cheating On Tests

The available research on gender differences in cheating on tests is largely based on self-reports. As indicated in Table 5.1.1.15, most evidence suggests that there is either no significant gender difference or that males are more prone to cheat than females.

Table 5.1.1.15. Cheating on tests.

Nature of Any Dif-ference				Postpubertal	
				Adolescent	Adult
Males more					**NORTH AMERICA** *United States*: J Michaels & Miethe 1989 (college); Tibbetts 1997 (college); BE Whitley 2001 (college, academic cheating)
No signif. difference				**NORTH AMERICA** *United States*: CD Johnson & Gormly 1972	**NORTH AMERICA** *United States*: Hendershott et al. 1999:352 (college, helping others cheat)
Females more					

5.1.2. Grades/Marks in Specific Academic Subject Areas

While most studies of gender differences in grades have concentrated on overall grade point average, some research has considered male/female differences in specific subject areas. The findings from these studies will now be reviewed.

5.1.2.1. Grades in Arithmetic and Mathematics

Findings concerning gender differences in arithmetic and mathematics have been mixed, although most studies indicate that males receive higher grades than do females during adolescence (Table 5.1.2.1). Among the factors that are likely to be responsible for some of the inconsistencies involve differing levels of complexities of arithmetic and math courses and greater proportions of males taking math courses. In a couple of studies, grades were compared after controlling for math scores on the SAT, which presumably compensates for gender differences in math ability going into a given course. Both of these studies concluded that when background math ability was controlled, females received higher grades than males.

Table 5.1.2.1. Grades in arithmetic and mathematics.

Nature of Any Difference	Prepubertal				Postpubertal	
				Childhood	Adolescent	Adult
Males more				**INTERNATIONAL** *Multiple Countries*: Sokoloff 2001 (32/32 countries)	**EUROPE** *Britain*: R Wood 1976; JS Bradberry 1989 **NORTH AMERICA** *United States*: LL Wise et al. 1979; Kimball 1989; LV Hedges & Friedman 1993; Hedges & Nowell 1995; DeMars 2000; Mau & Lynn 2000 (American National Education longitudinal study); Wester & Henriksson 2000; KE Ryan & Chiu 2001	
No signif. difference				**NORTH AMERICA** *United States*: Courtis 1911	**NORTH AMERICA** *United States*: Entwisle & Baker 1983 **OCEANIA** *Australia*: Lokan et al. 1996 (middle school)	
Females more				**NORTH AMERICA** *United States*: Pomerantz et al. 2002:399	**ASIA** *Taiwan*: Fan & Li 2005* **NORTH AMERICA** *United States*: Poffenberger & Norton 1963; Pallas & Alexander 1983; Kimball 1989; Wright & Houck 1995; Bridgeman & Lewis 1996*	**ASIA** *Taiwan*: Fan & Li 2005* (college) **NORTH AMERICA** *United States*: Wainer & Steinberg 1992 (college, controlled SAT-M scores); Bridgeman & Lewis 1996* (college, controlled SAT-M scores)

5.1.2.2. Grades in Computer Science

The available studies of gender differences in grades in computer science courses have concluded that men and women in college perform equally well (5.1.2.2).

Table 5.1.2.2. Grades in computer science.

Nature of Any Difference	Postpubertal
	Adult
Males more	
No signif. difference	**NORTH AMERICA** *United States*: VA Clarke & Chambers 1989 (college); HG Taylor & Mounfield 1989 (college)
Females more	

5.1.2.3. Grades in Language-Related Courses

All of the available studies of gender differences in language-related classes have found that females surpass males in grades received (Table 5.1.2.3).

Table 5.1.2.3. Grades in language-related courses.

Nature of Any Difference	Prepubertal	Postpubertal
	Childhood	Adolescent
Males higher		
No signif. difference		
Females higher	**EUROPE** *Britain*: A Clark & Trafford 1995 (foreign language); A Barton 1997 (foreign language); Place 1997 (foreign language) **NORTH AMERICA** *United States*: Pomerantz et al. 2002:399 (English)	**EUROPE** *Britain*: Bell 2001:474 (English) **NORTH AMERICA** *United States*: Wright & Houck 1995 (English); Mau & Lynn 2000

5.1.2.4. Grades in Science

Most of the available studies surrounding sex differences in grades given to students in science classes have concluded that males receive higher grades than do females (Table 5.1.2.4).

Table 5.1.2.4. Grades in science.

Nature of Any Difference	Prepubertal	Postpubertal	
	Childhood	Adolescent	Adult
Males higher	**NORTH AMERICA** *United States*: Heilman 1933 (10-year-olds)	**EUROPE** *Britain*: Cheng et al. 1995; Arnot et al. 1998 **NORTH AMERICA** *United States*: AM Jordan 1937; Edgerton & Britt 1944; Hedges & Nowell 1995 **INTERNATIONAL** *Multiple countries*: A Kelly 1978	**NORTH AMERICA** *United States*: Learned & Wood 1938 (college); Tai & Saddler 2001:1027* (college, calculus-based physics)
No signif. difference		**NORTH AMERICA** *United States*: Tai & Saddler 2001:1027* (physics)	
Females higher			**NORTH AMERICA** *United States*: Tai & Saddler 2001:1027* (college, algebra-based physics)

5.1.2.5. Grades in Social Sciences

Most of the research on grades in social science courses has been confined to economics. These studies have found males performing significantly better than females, both in high school and in college (Table 5.1.2.5).

Table 5.1.2.5. Grades in social sciences.

Nature of Any Difference	Postpubertal	
	Adolescent	Adult
Males higher	**NORTH AMERICA** *United States*: Siegfried 1979* (economics); Soper & Brenneke 1981 (economics); Soper & Walstad 1988 (economics); Walstad & Soper 1988 (economics); J Heath 1989 (economics); Walstad & Soper 1989 (economics)	**NORTH AMERICA** *Canada*: Rob & Robb 1999 (young, economics); *United States*: Siegfried 1979* (college, economics); Lumsden & Scott 1987 (college, economics); Gohmann & Spector 1989 (college, economics); M Watts & Lynch 1989 (college, economics); B Anderson et al. 1994 (college, economics); M Hirschfield et al. 1995 (college, economics majors, GRE)
No signif. difference		**NORTH AMERICA** *United States*: Nelson et al. 1999 (young, geography); Borg & Stranahan 2002a (college); Borg & Stranahan 2002b
Females higher	**INTERNATIONAL** *Multiple Countries*: Wilberg & Lynn 1999 (26 countries, history)	

5.1.2.6. Grades in Statistics

The average grades awarded to men and women in college in statistics courses have been the subject of several studies. As shown in Table 5.1.2.6, the conclusions have been very inconsistent, suggesting that if there are any gender differences they are small and dependent upon the detailed nature of the course content and style of instruction.

Table 5.1.2.6. Grades in statistics.

Nature of Any Difference					Postpubertal	
						Adult
Males higher						**NORTH AMERICA** *United States*: Feinberg & Halperin 1978 (college); Ware & Chastain 1989 (college)
No signif. difference						**NORTH AMERICA** *United States*: Buck 1985 (college); Mogull 1989 (college); Ware & Chastain 1989 (college); Fenster 1992 (college)
Females higher						**NORTH AMERICA** *United States*: Elmore & Vasu 1980 (college); Elmore & Vasu 1986 (college); Brooks 1987 (college); Raiszadeh & Ahmadi 1987 (college)

5.2
INTELLECTUAL/REASONING FACTORS

An important aspect of cognition has to do with intelligence and reasoning ability, although these concepts are also difficult to define and measure with any precision. Due to their importance, it is not surprising that considerable research would have been devoted to exploring possible gender differences in the numerous aspects of intelligence and reasoning.

5.2.1. Intellectual/Reasoning Factors in General

Some research has dug into the different abilities males and females possess as far as cognitive strategies or intellectual maturation. While some researchers were able to find no sex difference in reasoning abilities, others have shown otherwise.

5.2.1.1. Reasoning Abilities in General

General reasoning ability is a concept closely related to intelligence, although the former concept is a bit more global in its connotation. A fair number of studies have attempted to measure gender differences in reasoning ability among adolescents and adults, and, as shown in Table 5.2.1.1, these studies have largely concluded that males surpass females in reasoning ability. However, according to Lynn and Hyde (1989), the gender differences in reasoning skills are small and declining.

Table 5.2.1.1. Reasoning abilities in general.

Nature of Any Difference	Prepubertal				Postpubertal		Multiple Age Categories
				Childhood	Adolescent	Adult	
Males higher					**ASIA** *Singapore*: Lim 1994 **EUROPE** *Greece*: Alexopoulos 1996; *Portugal*: Almeida 1989 **MIDDLE EAST** *Israel*: Flynn 1998 **NORTH AMERICA** *United States*: Droege 1967; ME Backman 1972; SC Nash 1975; Feingold 1988b; Hedges & Nowell 1995 (scientific)	**EUROPE** *Britain*: Heron & Crown 1967; *Ireland*: Lynn 1996a; *Spain*: Contreras et al. 2001 **MIDDLE EAST** *Israel*: Zeidner 1986* (young, general, abstract) **NORTH AMERICA** *United States*: Dye & Very 1968* (general); Ramist et al. 1994 (college); Caretta 1997 (general, abstract); RN Jones & Gallo 2002:554 (elderly)	**AFRICA** *South Africa*: Owen & Lynn 1993* (general, abstract) **NORTH AMERICA** *United States*: Kaufman et al. 1995* (general)
No signif. difference				**NORTH AMERICA** *United States*: McAndrew 1943 (six-year-olds)		**NORTH AMERICA** *Canada*: McKelvie & Rohrberg 1978* (college, abstract); *United States*: Schaie & Willis 1993:53 (inductive reasoning); Reese et al. 2001	
Females higher						**EUROPE** *Spain*: Colom et al. 1999 (inductive reasoning, college, PMA subtest) **NORTH AMERICA** *United States*: Dye & Very 1968* (inductive, deductive); CD Miller et al. 1990 (college, inter-relating ideas) **OCEANIA** *Australia*: Watkins & Hattie 1985 (college, inter-relating ideas)	

5.2.1.2a. Intelligence/Mental Ability in General (Full Scale Intelligence) for Prepubertals

For decades, researchers have sought to determine if males and females differ regarding their average scores on tests of intelligence. Most reviews of these studies have concluded that no significant difference exists (Cattell 1971:131; Brody 1992:323; Court 1983:68; AR Jensen 1998:538; Halpern 2000:218; Halpern & Lamay 2000) although at least three summaries have asserted that a slight edge (in the range of about 4 IQ points) favors males beginning in late adolescence and continuing through full adulthood (Lynn 1999; Colom & Lynn 2004; Irwing & Lynn 2005).

In Table 5.2.1.3, no attempt was made to calculate the exact number of IQ point differences that might exist, since the focus was simply on whether differences were or were not statistically significant. Because of the large number of studies, the Table is presented in two sections, one for prepubertals and the other for adolescents and adults.

As one can see in Split-Table 5.2.1.2a, roughly equal numbers of studies pertaining to prepubertals have concluded that males surpass females as those concluding the opposite and that no significant sex difference exists. This suggests that if any gender differences do exist, they are exceedingly small.

Split-Table 5.2.1.2a. Intelligence/mental ability in general (full scale intelligence) for prepubertals.

Nature of Any Difference	Prepubertal		
	Toddler	Early Childhood	Childhood
Males higher		**NORTH AMERICA** *United States*: Hall 1891; Baldwin 1922 (IQ); SG Sapir 1966:989; Kaufman & Wang 1992:222	**ASIA** *China*: Ai 1945; Dai & Lynn 1994; Lynn & Dai 1994 **EUROPE** *Germany*: Bobertag 1911; *Greece*: DS Alexopoulos 1996*; *Netherlands*: Wiersma 1913* (IQ); *Scotland*: Anonymous 1949; Deary et al. 2004:134 (Raven) **NORTH AMERICA** *United States*: Thorndike 1903* (IQ); Libby & Cowles 1910; Terman 1916*; SD Porteus 1918 (older school age); Pressey 1918* (IQ); Pressey & Pressey 1921; Baldwin 1922 (IQ); Henman & Livingston 1922* (IQ); Terman 1925; Van Wagenen 1925; Paterson & Langlie 1926; Book & Meadows 1928*; Commins 1928*; Schultz 1928; Lentz 1929; Conrad et al. 1933; Terman & Merrill 1937; Seashore et al. 1950; Norman et al. 1962 (older school age) **OCEANIA** *New Zealand*: Lynn et al. 2005 (WISC-R, coding subtest, 8 & 9 year olds)
No signif. difference		**NORTH AMERICA** *United States*: Monroe 1903*; Goddard 1911* (IQ); Yerkes et al. 1915*; Terman 1916* (IQ); Trabue 1916 (IQ); Mulhall 1917 (IQ); Race 1918 (IQ); Bryan 1934*	**EUROPE** *Germany*: Cohn & Dieffenbacher 1911*; *Scotland*: MacMeeken 1939; Deary et al. 2003 (age 11) **MIDDLE EAST** *Israel*: Levinson 1957 **NORTH AMERICA** *United States*: Monroe 1903*; Thorndike 1903*; Goddard 1911*; Strong 1913*; Yerkes et al. 1915*; Neterer 1923; Madsen 1924; Davis 1928*; Lewerenz 1928*; Heilman 1933; Bryan 1934*; Havighurst & Janke 1944:363; Darley & Winitz 1961; Gainer 1962; Wozencraft 1963; Singer et al. 1968; Ruschival & Way 1971 (gifted); Greenberger et al. 1971; Kaufman & Kaufman 1983:146* **OCEANIA** *New Zealand*: DM Fergusson & Horwood 1997
Females higher	**NORTH AMERICA** *United States*: DA McCarthy 1930:30*; Honzik 1976:74	**AFRICA** *Mauritius*: Lynn et al. **NORTH AMERICA** *United States*: Goodenough 1928; DA McCarthy 1930:30*; Anastasi & D'Angelo 1952 (Goodenough Draw-a-Person test); Bradway & Thompson 1962*; Kaufman & Kaufman 1983:146*; N Raz et al. 1995 (IQ, among students with brain damage associated with premature birth)	**EUROPE** *Britain*: Wisenthal 1965; *Germany*: Franken 1912*; *Netherlands*: Wiersma 1913*; *Scotland*: Deary et al. 2004:134* (Moray House Test) **NORTH AMERICA** *United States*: Goddard 1911* (IQ); Pyle 1913b; AC Strong 1913* (IQ); Terman 1916*; Pressey 1918*; Whitmire 1920; Whipple 1927a*; Commins 1928*; Davis 1928*; Conrad et al. 1933*; Samuels 1943

5.2.1.2b. Intelligence/Mental Ability in General (Full Scale Intelligence) for Postpubertals

Turning to differences in IQ scores following the onset of puberty, a different pattern emerges. Split-Table 5.2.1.2b shows that the average scores of males and females on these tests in most studies shift in favor of males following the onset of puberty. This is especially true for studies that have focused entirely on adults. Nevertheless, many studies have failed to find any statistically significant differences.

Overall, this summary of the evidence suggests that there is a gender difference favoring males following the onset of puberty, but that the difference is small and therefore will be often statistically undetectable unless large samples are tested. This conclusion coincides with the meta-analysis reported by Irwing and Lynn (2005).

Split-Table 5.2.1.2b. Intelligence/mental ability in general (full scale intelligence) for postpubertals.

Nature of Any Difference	Postpubertal		Multiple Age Categories
	Adolescent	Adult	
Males higher	**AFRICA** *South Africa*: Visser 1987; Lynn 2002 (Ravin Progressive Matrices, 15-16 year olds) **ASIA** *China*: Lynn & Tse-Chan 2003 (Ravin Progressive Martices, 15-18 year olds) **EUROPE** *Bulgaria*: Paspalonova & Shtetinski 1983; *Britain*: AH Heim 1970; R Lynn 1992; *Estonia*: Allik et al. 1999* (IQ); Lynn et al. 2004* (16-18 yrs); *Greece*: Fatouros 1972; Alexopoulos 1996* (older); *Ireland*: Lynn 1996 (ages 17-18, differential aptitude test); *Netherlands*: Stinssen 1977; *Scotland*: R Lynn & Mulhern 1991; Born & Lynn 1994 (young); *Spain*: Colom & Lynn 2004 (IQ); *Sweden*: Stage 1988 **MIDDLE EAST** *Iran*: Mehryar et al. 1972* (young); *Israel*: Lieblich 1985 **NORTH AMERICA** *United States*: Libby & Cowles 1910*; Terman 1916*; Pressey 1918* (IQ); Henman & Livingston 1922* (IQ); Colvin & MacPhail 1924; Terman 1925* (IQ); Whipple 1927b; Book & Meadows 1928*; Perry 1929; ME Broom 1930:86 (young); Scanlon 1973 (young); Hedges & Nowell 1995:44	**ASIA** *China*: Ho et al. 2001 (elderly); *Indonesia*: Drenth et al. 1977 (young) **EUROPE** *Belgium*: Deltour 1993; *Britain*: R Lynn et al 2002 (college); Whiteside et al. 2004:45 (young); *Ireland*: Lynn 1996a (young); *Scotland*: R Lynn 1988; R Lynn & Mulhern 1991* (young); Lynn 1998 (WAIS-R); Deary et al. 2004:134 (elderly, Raven) **MIDDLE EAST** *Iran*: Mehryar et al. 1972* (young); *Israel*: Zeidner 1986 (young); JR Flynn 1998 (slight) **NORTH AMERICA** *Canada*: CM McCormick & Felson 1991; *United States*: King & M'Crory 1918 (young); Crawford 1926* (young); Paterson & Langlie 1926 (young); HS Conrad et al. 1933; Strange & Palmer 1953 (psychiatric patients); Goolishian & Foster 1954 (psychiatric patients); Nakamura 1958 (young); JR Wilson et al. 1975; CR Reynolds et al. 1987 (young); R Lynn & Mulhern 1991* (young); Ramist et al. 1994 (college applicants); Caretta 1997 (young); Lynn & Irwing 2004 (college); Jackson & Rushton 2006 **INTERNATIONAL** *Multiple Countries*: Lynn 1994 (on WAIS test)	**ASIA** *China*: Lynn & Dai 1993 (WAIS-R , 16-65 years); *Japan*: Hattori & Lynn 1997 (WAIS-R, ages 16-74 years) **EUROPE** *Estonia*: Allik et al. 1999*; *Netherlands*: Born & Lynn 1994 (WISC-R, information, similarities, arithmetic, vocabulary, comprehension subtests, ages 6-16) *Norway*: Nystrom 1983 **NORTH AMERICA** *United States*: Terman 1916 (Stanford Binet test, ages 4-16); Conrad et al. 1933*; Kaufman et al. 1995; Miele 1958; Lynn 1994:263; Arceneaux et al. 1996
No signif. difference	**EUROPE** *Britain*: IS Deary et al. 2003; *Germany*: Cohn & Dieffenbacher 1911*; Franken 1912*; *Spain*: Aluja-Fabregat et al. 2000 **MIDDLE EAST** *Turkey*: Tan 2003:1352 (older) **NORTH AMERICA** *Canada*: Hakstian & Cattell 1975 (older); *United States*: C Spearman 1904*; Courtis 1911* (IQ); Burt & Moore 1912; Yerkes et al. 1915*; Woolley 1915 (IQ); Terman 1916:69* (IQ); R Pintner 1924 (older); Lewerenz 1928*; Wechsler 1958; Marini 1978b (older); LV Hedges & Friedman 1993; Feingold 1994; Colom et al. 2000	**EUROPE** *Austria*: Doppelmayr et al. 2002:293; *Britain*: M Willmott & Brierley 1984 (WAIS); Reilly & Mulhern 1995 (young); Mellanby et al. 2000:382; *Germany*: Cohn & Dieffenbacher 1911* (young); *Spain*: Colom et al. 2000; Colom & Garcia-Lopez 2002 (university applicants); Abad et al. 2004 (university applicants, Ravin); Colom et al. 2004 (college, Raven) **NORTH AMERICA** *United States*: C Spearman 1904*; Burt & Moore 1912 (young); Crawford 1926* (young); Canady 1943 (young); RD Norman 1953 (young, Digit-Symbol aspect of IQ); RJ Howell 1955; Liddicoat 1961; Bradway & Thompson 1962* (young); LV Hedges & Nowell 1995; Geary et al. 2000 (young); J Shields et al. 2004:292 (IQ)	**AFRICA** *South Africa*: Owen & Lynn 1993* (Blacks & Whites) **EUROPE** *Spain*: Colom et al. 2002 (15-94 years old) **NORTH AMERICA** *United States*: C Spearman 1904*; Lehrke 1978:171; Brody 1992:323; Halpern 1992:63
Females higher	**EUROPE** *Estonia*: Lynn et al. 2004* (12-15 yrs); *Greece*: Alexopoulos 1996* (young) **NORTH AMERICA** *United States*: Pressey 1918*; Whipple 1927a*; Commins 1928*; JS Coleman 1961; Bradway & Thompson 1962*	**NORTH AMERICA** *United States*: P Kittler et al. 2004 (among the mentally disabled)	**AFRICA** *South Africa*: Owen & Lynn 1993* (East Indians) **NORTH AMERICA** *United States*: Conrad et al. 1933*

5.2.1.3. Intellectual/Mental Maturation

One study of the age at which males and females tend to reach their peak in intellectual performance indicates that females reach this peak at a significantly younger age than do males (Table 5.2.1.3).

Table 5.2.1.3. Intellectual/mental maturation.

Nature of Any Difference							Multiple Age Categories
Males more							
No signif. difference							
Females more							**NORTH AMERICA** *United States*: Hattori 1999:419

5.2.1.4. Intellectual Decline With Age

People tend to gradually decline in their scores on IQ tests beyond early adulthood. Studies that have compared adolescents and adults over time have concluded that either the decline is greater for females than for males or that it is statistically equivalent for both sexes (Table 5.2.1.4).

Table 5.2.1.4. Intellectual decline with age.

Nature of Any Difference					Postpubertal		Multiple Age Categories
						Adult	
Males more/faster							
No signif. difference						**EUROPE** *Netherlands*: Aartsen et al. 2004:37 (elderly) **NORTH AMERICA** *United States*: Prince et al. 1996 (elderly); Jacqmin-Gadda et al. 1997 (elderly); Maitland et al. 2000 (elderly); LL Barnes et al. 2003 (elderly, Catholic clergy, age controlled)	**NORTH AMERICA** *United States*: Blum et al. 1972
Females more/faster						**EUROPE** *Italy*: Dealberto et al. 1997 (elderly); *Sweden*: Zhu et al. 1998 (elderly) **NORTH AMERICA** *United States*: Brayne et al. 1995a (elderly); S Nixon et al. 1995 (alcoholics); Rozzini et al. 1996 (elderly)	**NORTH AMERICA** *United States*: Terman & Oden 1947; Bayley & Oden 1955; Kagan et al. 1958

5.2.1.5. Intelligence, Variability in

Nearly all relevant studies have concluded that males exhibit greater variability in their scores on IQ tests than do females (Table 5.2.1.5). In other words, greater proportions of males score exceedingly high and exceedingly low relative to females. This conclusion is contrary to a meta-analysis performed by Irwing and Lynn (2005) in which they concluded that females actually exhibit greater variability than males.

Table 5.2.1.5. Intelligence, variability in.

Nature of Any Difference	Prepubertal				Postpubertal		Multiple Age Categories
				Childhood	Adolescent	Adult	
Males greater				**EUROPE** *Britain*: RE Snow 1995; Deary et al. 2003; *Scotland*: Scottish Council for Research in Education 1949 **NORTH AMERICA** *United States*: McNemar & Terman 1936; Singer et al. 1968; Benbow 1988a	**EUROPE** *Scotland*: JA Roberts et al. 1945; Born & Lynn 1994; Deary et al. 2003 **NORTH AMERICA** *United States*: Book & Meadows 1928; Feingold 1992a; Feingold 1992b; Hedges & Friedman 1993; Feingold 1994; Hedges & Nowell 1995		**NORTH AMERICA** *United States*: Penrose 1963:186; B Childs 1965:803; Heim 1970:136; AR Jensen 1971:145; Hendrickson 1982b
No signif. difference				**EUROPE** *Scotland*: MacMeekan 1939		**EUROPE** *Britain*: Pearson 1897 (young)	**NORTH AMERICA** *United States*: McNemar & Terman 1936
Females greater				**LATIN AMERICA** *Chile*: Valenzuala et al. 1998			

5.2.1.6. Proportion Above Average Intelligence/Genius

Research undertaken to determine if greater proportions of males or females score one, two, or three standard deviations above the mean on standardized IQ tests (usually scores in excess of 130 or two standard deviations above the mean are considered to be in the genius range) have reached mixed conclusions. However, most studies have concluded that greater proportions of males obtain scores well above average than do females, especially following puberty (Table 5.2.1.6). This conclusion is consistent with a literature review conducted by Goldberg (1977).

Table 5.2.1.6. Proportion above average intelligence/genius.

Nature of Any Difference	Prepubertal	Postpubertal	
	Childhood	Adolescent	Adult
Males more	**EUROPE** *Scottish*: Scottish Council 1933; Deary et al. 2003 (11 year olds); *Slovakia*: Ostatnikova et al. 2002:8 **NORTH AMERICA** *United States*: AM Jones 1925; Terman et al. 1925*	**NORTH AMERICA** *United States*: Terman 1925:54*; Henmon & Holt 1931; Terman & Burks 1933; Benbow & Stanley 1983a (slightly higher for verbal, 12-times higher for math); J Wiley & Goldstein 1991	**NORTH AMERICA** *United States*: Thurstone & Thurstone 1937 (college); Thurstone & Thurstone1938 (college)
No signif. difference	**NORTH AMERICA** *United States*: Witty 1930		
Females more	**EUROPE** *Scotland*: MacMeeken 1939 **NORTH AMERICA** *United States*: MD Jenkins 1936 (Blacks); WD Lewis 1940; WD Lewis 1945		**NORTH AMERICA** *United States*: Witty 1934 (college)

5.2.1.7. Proportion Below Average in Intelligence/Mental Retardation

Numerous studies have sought to determine if a gender difference exists in the proportions of those who score below average on standardized IQ tests (usually below 70 or two standard deviations below the mean). In a closely related vein, a few studies have reported on the proportion of males and females who are institutionalized for mental retardation. As shown in Table 5.2.1.7, nearly all of the relevant studies have concluded that below average intelligence and institutional confinement for mental retardation (I) are more prevalent among males than among females.

Table 5.2.1.7. Proportion below average in intelligence/mental retardation.

Nature of Any Difference	Prepubertal			Postpubertal		Multiple Age Categories
	Toddler	Early Childhood	Childhood	Adolescent	Adult	
Males more	**NORTH AMERICA** *Canada*: Luce & Wand 1977:81*	**NORTH AMERICA** *Canada*: Luce & Wand 1977:81*; Broman et al. 1987	**EUROPE** *Britain*: Wing 1971 (urban population); *Holland*: Wiersma 1913; *Scottish*: Deary et al. 2003 (11 year olds) **NORTH AMERICA** *Canada*: Luce & Wand 1977:81*; *United States*: Lurton 1912*; Phillips 1912; Bevard 1913*; Farrell 1916/1917; Danby 1934; Singer et al. 1968; Lehrke 1972; Abramowicz & Richardson 1975	**NORTH AMERICA** *Canada*: Luce & Wand 1977:81*; *United States*: Lurton 1912*; Bevard 1913*		**EUROPE** *Denmark*: E Berg 1966; *Britain*: Rutter & Tizard 1970; *Netherlands*: Verbraak 1975 (I); *Poland*: Stomma & Wald 1972 (I); *Scotland*: Scottish Council for Research in Education 1949 (I); *Sweden*: Socialstyrelsen 1972 (I) **MIDDLE EAST** *Pakistan*: Hasan 1972:62 **NORTH AMERICA** *Canada*: British Columbia Dept. of Health Service 1971 (I); *United States*: GE Johnson 1897 (I); Danby 1934 (test scores); Rosanoff et al. 1934a; Wunsch 1951 (I); New York State Dept. of Mental Hygiene 1955 (I); WP Richardson & Higgins 1964 (I); EW Reed & Reed 1965 (I); AR Jensen 1971:154 (I); Lehrke 1978:178 (I) **OCEANIA** *Australia*: G Turner & Turner 1974 (I)
No signif. difference			**NORTH AMERICA** *United States*: Goddard 1911; Strong 1913		**NORTH AMERICA** *United States*: Hollingsworth 1914	
Females more						

5.2.1.8. Mental Retardation Among Persons With Fragile X Syndrome

Fragile X syndrome is the most common known inherited cause of mental impairment in humans. The studies show that males who have fragile X are more likely to express mental retardation (Table 5.2.1.8).

Table 5.2.1.8. Mental retardation among persons with fragile X syndrome.

Nature of Any Difference	Postpubertal	Multiple Age Categories
	Adolescent	
Greater in males	**EUROPE** *Sweden*: Blomquist et al. 1985 (15-26 years old)	**EUROPE** *Finland*: Kahkonen et al. 1987 (birth cohort born 1969-1972) *Sweden*: Blomquist et al. 1981 (11-22 year olds); Blomquist et al. 1982 (12-23 year olds); Blomquist et al. 1983 (13-24 year olds); Gustavson et al. 1986 (16-27 year olds); Holmgren et al. 1988 (eleven families over 8-11 generations)
No signif. difference		
Greater in females		

5.2.1.9. Ability of Standardized IQ Tests to Predict Grades

Studies undertaken to determine if a gender difference exists in the ability of standardized scores on IQ tests to predict grades have all concluded that they do so to a significantly greater degree for females than for males (Table 5.2.1.9).

Table 5.2.1.9. Ability of standardized IQ tests to predict grades.

Nature of Any Difference	Prepubertal	Postpubertal	
	Childhood	Adolescent	Adult
Better for males			
No signif. difference	**EUROPE** *Britain*: JA Roberts et al. 1935; *Scotland*: Scottish Council for Research in Education 1933 **NORTH AMERICA** *United States*: Pintner 1924	**OCEANIA** *Australia*: Hales 1932	
Better for females	**EUROPE** *Scotland*: Macmeeken 1939 **NORTH AMERICA** *United States*: F Samuels 1943 (1st graders, Kuhlmann-Anderson IQ test); WD Lewis 1945 (Kuhlmann-Anderson IQ test)		**NORTH AMERICA** *United States*: Seashore 1962 (young); Lavin 1965 (young); Stanley & Porter 1967 (young); RL Linn 1990 (young); JW Young 1991 (young); JW Young 1994 (young)

5.2.1.10. Intelligence and Neural Efficiency

According to one study, males exhibited a stronger positive correlation between scores on IQ tests and a physiological measure of so-called neural efficiency than was the case for females (Table 5.2.1.10).

Table 5.2.1.10. Intelligence and efficiency.

Nature of Any Difference	Postpubertal
	Adult
Stronger positive correlation for males	**OCEANIA** *Australia*: Neubauer & Fink 2003
No signif. difference	
Stronger positive correlation for females	

5.2.1.11. Inspection Time Scores

In recent years, scientists have sought to reveal some of the neurological underpinnings of intelligence and reasoning ability. This search has lead to the exploration of how quickly brain waves register a particular pattern in response to seeing a stimuli, suggesting that the subject recognizes it, a phenomenon known as *inspection time* (*IT*). A substantial inverse correlation (~ -.50) has been shown to exist between these brain wave reaction scores and scores on standardized IQ tests, suggesting that reaction times tap into an important neurological component of general intelligence (NR Burns & Nettelbeck 2005:440). Table 5.2.1.11 suggests that there is little if any significant gender difference in IT scores.

Table 5.2.1.11. Inspection time scores.

Nature of Any Dif-ference	Postpubertal	Multiple Age Categories
	Adolescent	
Males faster	**EUROPE** *Spain*: Codorniu-Raga & Vigil-Colet 2003 (young)	
No signif. difference	**NORTH AMERICA** *United States*: Luciano et al. 2001 (twins)	**OCEANIA** *Australia*: NR Burns & Nettelbeck 2005 (childhood through adulthood)
Females faster		

5.2.1.12. Reaction Time Scores

Reaction time studies of varying degrees of complexity have been developed. These include ones in which subjects are asked to respond to a stimulus (such as a light flashing) by pressing two or more buttons, depending on the color of the light. A modest negative correlation between reaction time and intelligence has been found, meaning that persons who score high on IQ tests tend to respond more quickly in reaction time tasks than do low IQ persons. Regarding sex differences, Table 5.2.1.12 indicates that males tend to be faster than females in reaction time experimental tasks, although one study reported that while females were slower, they made fewer errors.

Table 5.2.1.12. Reaction time scores.

Nature of Any Dif-ference	Prepubertal	Postpubertal	
	Childhood	Adolescent	Adult
Males faster		**NORTH AMERICA** *United States*: JE Roberts & Bell 2000* (mental rotation)	**EUROPE** *Britain*: Welford 1980; *Spain*: Botella et al. 2001 **MIDDLE EAST** *Israel*: Birenbaum et al. 1994 (college, IQ & mental rotation tests); *Turkey*: Dane & Erzurumlugoglu 2003 **NORTH AMERICA** *Canada*: Tapley & Bryden 1977; Desrocher et al. 1995 (college, right handers); *United States*: CE Noble et al. 1964; Botwinick & Thompson 1966; Coules & Avery 1966; Barnsley & Rabinovitch 1970; Giambra & Quilter 1989; J Adam et al. 1999* (speed); Szinnai et al. 2005
No signif. difference	**EUROPE** *Britain*: SS David et al. 1986* (peripheral stimuli, ages 6, 8, and 11) **NORTH AMERICA** *United States*: JE Roberts & Bell 2000* (mental rotation)		**EUROPE** *Britain*: SS David et al. 1986* (peripheral stimuli) **NORTH AMERICA** *United States*: Thackray et al. 1978 (radar task)
Females faster			**NORTH AMERICA** J Adam et al. 1999* (accuracy)

5.2.1.13. Relationship Between Intelligence and Social Status Aspirations

A positive relationship between intelligence and social status has been well documented. Two studies found that this relationship was stronger for males than it was for females (Table 5.2.1.13).

Table 5.2.1.13. Relationship between intelligence and social status aspirations.

Nature of Any Dif-ference	Postpubertal
	Adult
Stronger for males	**NORTH AMERICA** *United States*: Sewell et al. 1957 (occupational status); Hout & Morgan 1975 (occupational status)
No signif. difference	
Stronger for females	

5.2.1.14. Relationship Between Academic Ability and Occupational Aspirations

Research was undertaken to assess gender differences in any relationship between occupational aspirations and academic ability (measured either in terms of IQ scores or school grades). As shown in Table 5.2.1.14, they have all concluded that the relationship is stronger for males than for females.

Table 5.2.1.14. Relationship between academic ability and occupational aspirations.

Nature of Any Difference	Postpubertal
	Adolescent
Greater for males	**NORTH AMERICA** *United States*: RH Turner 1966; WH Sewell & Shah 1967; WH Sewell & Shah 1968a; WH Sewell & Shah 1968b; AE Bayer 1969; Hout & Morgan 1975
No significant difference	
Greater for females	

5.2.2. Language-Related Reasoning Ability

People obviously vary in their abilities to use language. The following tables summarize what has been revealed concerning gender differences in language-related reasoning abilities.

5.2.2.1. Language-Related Reasoning and Comprehension in General

Language-related reasoning in general refers to a person's basic ability to construct logical linguistic arguments and to comprehend language. According to Table 5.2.2.1, females surpass males in these general reasoning skills.

Table 5.2.2.1. Language-related reasoning and comprehension in general.

Nature of Any Difference	Prepubertal		Postpubertal	
	Early Childhood	Childhood	Adolescent	Adult
Males better	**NORTH AMERICA** *United States*: Anastasi & D'Angelo 1952* (Blacks)			
No signif. difference				
Females better	**NORTH AMERICA** *United States*: Anastasi & D'Angelo 1952* (Whites)	**NORTH AMERICA** *United States*: Stalnaker 1941 (comprehension); Stroud & Lindquist 1942 (comprehension)	**EUROPE** *Britain*: R Lynn 1992* (aptitude tests); *Germany*: Kirkcaldy et al. 2003:54 (self-rated) **NORTH AMERICA** *United States*: R Lynn 1992* (aptitude tests); JC Stanley et al. 1992; Wright & Houck 1995 (aptitude tests)	**NORTH AMERICA** *United States*: JC Morris et al. 1989 (elderly, Whites); Ganguli et al. 1991 (elderly, rural Whites);Unverzagt et al. 1996 (elderly, Blacks) **OCEANIA** *New Zealand*: BAS Martin 2003

5.2.2.2. Reading Ability

The ability to read is obviously an important aspect of being educated. Many studies have compared the sexes with respect to reading ability (or reading readiness in the case of preschoolers and young school aged children). The findings have been far from consistent, although they largely favor females as being better at reading and comprehending what they read than males at comparable ages (Table 5.2.2.2). Some of the seeming inconsistencies may be explainable in terms of the exact type of material being read. For example, some of the few studies that indicate that males are better at reading pertain to fairly narrow subject areas such as science and engineering.

Table 5.2.2.2. Reading ability.

Nature of Any Difference	Prepubertal				Postpubertal		Multiple Age Categories
			Early Childhood	Childhood	Adolescent	Adult	
Males better				**AFRICA** *Nigeria*: DD Johnson 1976* **EUROPE** *Britain*: DD Johnson 1976* *Germany*: RC Preston 1962:353* (better at reading) **NORTH AMERICA** *United States*: Haggard 1957 (lab school); DD Johnson 1973*	**EUROPE** *Britain*: WH King 1959 (practical & mechanical) **NORTH AMERICA** *United States*: Coffman 1961* (scientific & business)	**NORTH AMERICA** *United States*: Moore 1939 (young)	
No signif. difference			**NORTH AMERICA** *United States*: Giuliani 1968 (reading readiness)	**LATIN AMERICA** *Peru*: HW Stevenson et al. 1990 **NORTH AMERICA** *Canada*: MP Bryden 1972 (older); *United States*: Schiller 1934; Millard 1940; Broom 1941*; F Samuels 1943; KM Parsley et al. 1963; Klaus & Gray 1968 (readiness); Asher & Gottman 1973 (5th graders); Asher & Markell 1974; Heydorn 1983 **OCEANIA** *Australia*: Marks & Ainley 1997 (reading comprehension); P Gilbert 1998; *New Zealand*: Prochnow et al. 2001	**NORTH AMERICA** *United States*: Broom 1941* **OCEANIA** *New Zealand*: DM Fergusson & Horwood 1997:87	**NORTH AMERICA** *United States*: MC Hughes 1953* (young); WW Clark 1959 (young)	**NORTH AMERICA** *Canada*: TJB Kline 2004
Females better			**NORTH AMERICA** *United States*: CC Bennett 1938; F Samuels 1943; Dykstra & Tinney 1969 (readiness); H Brown 1971	**NORTH AMERICA** *Canada*: DD Johnson 1976*; *United States*: Burt & Moore 1912; Terman 1925 (gifted); Commins 1928; St. John 1932; FT Wilson et al. 1939; Durrell 1940; Kopel & Geerdes 1942; Stroud & Lindquist 1942*; Kopel 1943; J Jackson 1944; Yedinack 1949 (young); Ilg & Ames 1950; MC Hughes 1953*; IH Anderson et al. 1957; AT Gates 1961; RC Preston 1962:353* (better at reading); Balow 1963; Stranchfield 1965; Mumpower 1970; Blom 1971; Schaie & Roberts 1971:6; DD Johnson 1976*; Naiden 1976; Leinhardt et al. 1979; Lewis & Hoover 1987; Feingold 1993; Mullis et al. 1993; LV Hedges & Nowell 1995; US Department of Education 2000 **OCEANIA** *Australia*: McIntyre & Wood 1935; *New Zealand*: DM Fergusson & Horwood 1997:87* (teacher rated); A Gilmore 1998 (young) **INTERNATIONAL** *Multiple Countries*: Sokoloff 2001 (32 out of 32 countries)	**EUROPE** *Netherlands*: Klinkenberg 1913 **NORTH AMERICA** *United States*: M Monroe 1932; Carroll 1933; AM Jordan 1937; Moore 1939*; JE Moore 1940 (Whites); Stroud & Lindquist 1942*; Coffman 1961* (humanities & art); Hitchcock & Pinder 1974; Entwisle & Baker 1983 (young) **OCEANIA** *New Zealand*: DM Fergusson & Horwood 1997:87* (young, teacher rated)	**NORTH AMERICA** *United States*: Carroll 1933* (young); Moore 1939* (young); St. Sauver et al. 2001	

5.2.2.3. Language Development

Since the early part of the 20th Century, numerous studies have compared the sexes with respect to how well developed their use of language seems to be. As shown in Table 5.2.2.3, most studies have concluded that females exhibit significantly more rapid or advanced development than males.

Table 5.2.2.3. Language development.

Nature of Any Difference	Prepubertal				Postpubertal		Multiple Age Categories
		Toddler	Early Childhood	Childhood	Adolescent	Adult	
Males develop faster				**NORTH AMERICA** *United States*: Burt & Moore 1912		**NORTH AMERICA** *United States*: Wells 1911 (young); Haggerty & Kempf 1913 (young)	
No signif. difference		**NORTH AMERICA** *United States*: ME Smith 1926					**EUROPE** *Germany*: Furst 1907
Females develop faster		**EUROPE** *Britain*: Lutchmaya et al. 2002b (vocabulary) **NORTH AMERICA** *United States*: Mead 1913; Mead 1916; Terman 1933; Irwin & Chen 1946; T Moore 1967 (beginning to talk); Smolak 1986 (language usage)	**NORTH AMERICA** *United States*: Hall 1891; Doran 1907; Goodenough 1927; D McCarthy 1953; Prior et al. 1993	**NORTH AMERICA** *United States*: Ballard 1912; Pyle 1913b; Gates 1916b; Trabue 1916; Mulhall 1917; Pyle 1920*; Book & Meadows 1928*; Commins 1928; Conrad et al. 1933*; AW Mills 1947	**EUROPE** *Netherlands*: Klinkenberg 1913 **NORTH AMERICA** *United States*: Pyle 1920*; Book & Meadow 1928*	**NORTH AMERICA** *United States*: King & M'Crory 1918 (young); Crawford 1926 (young); Paterson & Langlie 1926 (young); Noeh & Guilford 1930 (young)	**NORTH AMERICA** *United States*: Conrad et al. 1933*

5.2.2.4. Literacy

Literacy refers to the ability to read and write at least at a minimal level of efficiency. Table 5.2.2.4 shows that most studies of children and adolescents have concluded that females are more literate than males. However, in adulthood, males seem to catch up and even surpass females in their basic reading and writing abilities. These differences may reflect the historical tendency for males to receive more schooling than females, especially in developing countries.

Table 5.2.2.4. Literacy.

Nature of Any Dif-ference	Prepubertal	Postpubertal		Multiple Age Categories
	Childhood	Adolescent	Adult	
Males more literate			**AFRICA** *Brunei*: Kinsella & Velkoff 2001:88*; *Sri Lanka*: de Munck et al. 2002:228; *Uganda*: Kinsella & Velkoff 2001:88*; *Zimbabwe*: Kinsella & Velkoff 2001:88* **ASIA** *China*: Yi et al. 2003 (elderly); *Thailand*: Kinsella & Velkoff 2001:88* (elderly) **LATIN AMERICA** *Bolivia*: Kinsella & Velkoff 2001:88* **MIDDLE EAST** *Iran*: Kinsella & Velkoff 2001:88*; *Jordan*: Kinsella & Velkoff 2001:88*	**ASIA** *India*: S Gleason 2001 **INTERNATIONAL** *Multiple Countries*: Dijkstra & Hanmer 2000:68* (7/20 countries)
No signif. difference		**NORTH AMERICA** *United States*: Loban 1976*	**AFRICA** *Botswana*: Kinsella & Velkoff 2001:88* **LATIN AMERICA** *Chili*: Kinsella & Velkoff 2001:88*	**INTERNATIONAL** *Multiple Countries*: Dijkstra & Hanmer 2000:68* (12/20 countries)
Females more literate	**NORTH AMERICA** *Canada*: Council of Ministries of Education 1994; Gambell & Hunter 2000; *United States*: Loban 1976*	**EUROPE** *Britain*: Stobart et al. 1992; *Sweden*: Stage 1988 **NORTH AMERICA** *Canada*: Gouvernment du Quebec 1996; British Columbia Ministry of Education 1997; Atlantic Provinces Education Foundation 1996; Saskatchewan Education 1996; Saskatchewan Education 1997a; Saskatchewan Education 1997b; Deslandes et al. 1998; Government of Newfoundland & Labrador 1998; Saskatchewan Education 1998; *United States*: Vogt 1973:3 **OCEANIA** *Australia*: Daley 1985		**LATIN AMERICA** *Jamaica*: Dijkstra & Hanmer 2000:68*

5.2.2.5. Naming Synonyms

Two studies presented males and females with a series of words and asked them to name as many synonyms as they could. One study found the average number of synonyms for females was greater, while the other study found the opposite (Table 5.2.2.5).

Table 5.2.2.5. Naming synonyms.

Nature of Any Dif-ference	Adult
Males more	**EUROPE** *Britain*: Neave et al. 1999*; Rahman & Wilson 2003
No signif. difference	
Females more	**NORTH AMERICA** *United States*: Neave et al. 1999* (young)

5.2.2.6. Animal Naming Test

Sex differences in the ability to accurately identify types of animals by name were investigated by one study. It found males and females to not differ significantly in this ability (Table 5.2.2.6).

Table 5.2.2.6. Animal naming test.

Nature of Any Difference	Postpubertal
	Adult
Males better	**NORTH AMERICA** *United States*: McKenna & Parry 1994
No signif. difference	**NORTH AMERICA** *Canada*: CM McCormick & Felson 1991
Females better	

5.2.2.7. Picture Naming

For adolescents and adults, males are more proficient in naming pictures of animals while for females, they surpassed males in naming fruit and vegetables. There was no significant difference in the naming of synthetic objects (Table 5.2.2.7).

Table 5.2.2.7. Picture naming.

Nature of Any Difference	Postpubertal
	Adult
Males more	**NORTH AMERICA** *United States*: Ripich et al. 1995 (elderly, Alzheimer's patients, Boston Naming Test); Welch et al. 1996 (elderly, Boston Naming Test)
No signif. difference	**NORTH AMERICA** *United States*: LaBarge et al. 1986 (Boston Naming Test); McKenna & Parry 1994* (synthetic objects); Ivnik et al. 1996 (elderly, Boston Naming Test)
Females more	**NORTH AMERICA** *United States*: McKenna & Parry 1994 (fruit, vegetables)

5.2.2.8. Reading Disabilities/Problems

Reading disabilities (or serious difficulties reading) have been found to predominate among males, with only a couple of studies failing to find a significant gender difference (Table 5.2.2.8).

Table 5.2.2.8. Reading disabilities/problems.

Nature of Any Difference	Prepubertal		Multiple Age Categories
	Early Childhood	Childhood	
Males more	**NORTH AMERICA** *United States*: Katusic et al. 2001; Yedinack 1949	**EUROPE** *Britain*: Yule et al. 1974; Berger et al. 1975 **NORTH AMERICA** *United States*: M Monroe 1935; Kopel & Geerdes 1942; AT Gates 1961; Bannatyne 1971; Rutter &Yule 1977; Shaywitz et al. 1990; DeFries et al 1991; Stein 1994; Spear-Swerling & Sternberg 1996; Adelman & Vogel 1998; SJ Wadsworth et al. 1992; C Lewis et al. 1994; KA Flannery et al. 2000 **OCEANIA** *New Zealand*: Kerslake 1999	**NORTH AMERICA** *United States*: Flannery et al. 2000 **INTERNATIONAL** *Multiple Countries*: Rutter et al. 2004:2011
No signif. difference		**NORTH AMERICA** *United States*: Shaywitz et al. 1990 (small sample); Shaywitz et al. 1995	
Females more			

5.2.2.9. Dyslexia

Dyslexia has to do with unusual slowness and/or difficulties in learning to read. Because difficulties vary in degree, estimates of the prevalence of dyslexia vary widely. Regarding sex differences, a few studies suggest that no significant differences exist, but most indicate that the prevalence is higher in males than for females (Table 5.2.2.9).

Table 5.2.2.9. Dyslexia.

Nature of Any Dif-ference	Prepubertal	Postpubertal		Multiple Age Categories
	Childhood	Adolescent	Adult	
Males more	**EUROPE** *Britain*: Ingram 1959; Rutter & Tizard 1970 **NORTH AMERICA** *United States*: Jordan 1974; Aaron & Handley 1975; Heydorn 1983; DeFries et al. 1991	**EUROPE** *Britain*: Rutter & Yule 1975 **NORTH AMERICA** *United States*: Wallschlaeger & Hendricks 1997 (college)	**NORTH AMERICA** *United States*: Lambe 1999	**EUROPE** *Britain*: Annett 1983:25
No signif. difference	**NORTH AMERICA** *United States*: EJ Gibson et al. 1962; RD Nelson & Peoples 1975; Stevenson et al. 1976			
Females more				

5.2.2.10. Spelling Ability

Most studies have found females to be better spellers than males, especially following the onset of puberty (Table 5.2.2.10).

Table 5.2.2.10. Spelling ability.

Nature of Any Difference	Prepubertal	Postpubertal	Multiple Age Categories
	Childhood	Adolescent	
Males better	**NORTH AMERICA** *United States*: Heilman 1933; Dykstra & Tinney 1969; CC Weisfeld et al. 1983:706 (performance in a spelling bee)		
No signif. difference	**EUROPE** *Germany*: Faber 2003* (self-rated)		
Females better	**EUROPE** *Germany*: Faber 2003* (objective test) **NORTH AMERICA** *United States*: Haggard 1957 (university lab school); WW Clark 1959*; RD Norman et al. 1962 (older) **OCEANIA** *New Zealand*: DW Fergusson & Horwood 1997:87* (teacher rated)	**EUROPE** *Britain*: R Lynn 1992* (aptitude tests, ages 13-18) **NORTH AMERICA** *Canada*: Hakstian & Cattell 1975:303; *United States*: Wesman 1949; Terman & Tyler 1954; WW Clark 1959*; Bennett et al. 1966; R Lynn 1992* (aptitude tests); JC Stanley et al. 1992*; Baenninger & Newcombe 1995 **OCEANIA** *New Zealand*: DW Fergusson & Horwood 1997:87* (young, teacher rated) **INTERNATIONAL** *Multiple Countries*: Colom & Lynn 2004:80	**NORTH AMERICA** *United States*: JC Stanley et al. 1992*

5.2.2.11. Verbal Analogy Skills

One study compared adolescents of both sexes regarding their comprehension of verbal analogies. It found males to be better than females in this regard (Table 5.2.2.11).

Table 5.2.2.11. Verbal analogy skills.

Nature of Any Difference	Postpubertal
	Adolescent
Males better	**NORTH AMERICA** *United States*: Lim 1994 (comprehension)
No signif. difference	
Females better	

5.2.2.12. Verbal/Language/Reading Comprehension

Sex differences in the ability to understand verbal instructions and factual information have been investigated by several studies, with mixed results. It would appear that if there are any sex differences, they are exceedingly small and dependent upon the specific nature of what is being communicated.

Tests designed to assess how well individuals comprehend what they read have reached mixed conclusions (as with reading ability) regarding any sex difference, although with a general tilt toward females being more capable (Table 5.2.2.12).

Table 5.2.2.12. Verbal/language/reading comprehension.

Nature of Any Difference	Prepubertal		Postpubertal	
	Early Childhood	Childhood	Adolescent	Adult
Males more	**NORTH AMERICA** *United States*: RH Kraft & Nickel 1995 (right-handers)	**EUROPE** *Germany*: Preston 1962* (reading, age 11)	**NORTH AMERICA** *United States*: Woody 1937 (comprehension)	
No signif. difference		**EUROPE** *Germany*: Preston 1962* (reading, age 9)	**NORTH AMERICA** *Canada*: Hakstian & Cattell 1975; *United States*: Stroud & Lindquist 1942* (late, reading); Havighurst & Breese 1947; Hobson 1947; Herzberg & Lapkin 1954; WW Clark 1959	**NORTH AMERICA** *United States*: Janowsky et al. 1998:426 (vocabulary comprehension) **OCEANIA** *Australia*: Liddicoat 1961
Females more		**NORTH AMERICA** *United States*: Stroud & Lindquist 1942* (reading); RD Norman et al. 1962 (older, reading); Lahaderme 1967 (reading, 6th graders); Schaie & Roberts 1970	**NORTH AMERICA** *United States*: Flanagan et al. 1961(reading); HI Walberg 1969; WJ Meyer & Bendig 1961; Hitchcock & Pinder 1974; Mullis 1993; Baenninger & Newcombe 1995 (language); Hedges & Nowell 1995 (reading); Willingham & Cole 1997 (reading, stores with social themes)	**NORTH AMERICA** *United States*: Neave et al. 1999 (young)

5.2.2.13. Verbal Fluency

The ability to use language efficiently is often assessed by asking subjects to perform various linguistic tasks within a prescribed time period. The speed with which these tasks are performed is known as verbal fluency. The two most common types of verbal fluency are known as letter fluency (naming as many words containing a particular letter within a set time limit) and category fluency (naming as many types of animals or some other category of object within a set time limit). Overall, most studies have concluded that females are more verbally fluent than males, especially regarding letter fluency (Table 5.2.2.13). However, in adulthood, greater numbers of studies either show no significant sex differences or have found males to be more verbally fluent than females.

Table 5.2.2.13. Verbal fluency.

Nature of Any Difference	Prepubertal				Postpubertal		Multiple Age Categories
		Toddler	Early Childhood	Childhood	Adolescent	Adult	
Males more						**EUROPE** *Britain*: Rahman & Wilson 2003* (letter fluency task from the controlled oral word association test) **NORTH AMERICA** *United States*: Kempler et al. 1998 (category fluency)	
No signif. difference						**ASIA** *India*: Mathuranath et al. 2003 (elderly, education controlled) **EUROPE** *Britain*: Neave et al. 1999 (number of "L" words produced); Rahman & Wilson 2003* (category fluency from the oral word association test); Halari et al. 2005* (letter fluency) **NORTH AMERICA** *Canada*: Cauthen 1978 (ages 20-94, controlled oral word association test); Crossley et al. 1997* (elderly, category fluency); *United States*: Ganguli et al. 1991 (elderly); Ripich et al. 1995 (elderly, Alzheimers patients); Boone 1998 (ages 45-84, controlled oral word association test); Janowsky et al. 1998	**NORTH AMERICA** *Canada*: Yeudall et al. 1986 (ages 15-40, oral word association test)
Females more		**NORTH AMERICA** *United States*: Rutter 1977	**EUROPE** *Sweden*: B Bohm et al. 2004 **NORTH AMERICA** *United States*: Wellman et al. 1931 (articulation); MF Little & Williams 1937 (articulation); RH Kraft & Nickel 1995 (right-handers)	**NORTH AMERICA** *Canada*: Gaddes & Crockett 1975 (ages 6-13, aprcen Benton aphasia test); *United States*: Winitz 1959; Sincoff & Sternberg 1987 (young); Sulter & Wit 1996	**NORTH AMERICA** *Canada*: Hakstian & Cattell 1975; *United States*: Havighurst & Breese 1947; Hobson 1947; WW Clark 1959; Goda & Griffith 1962 (retarded persons); HW Gordon & Lee 1986* (verbal fluency); Hines 1990 (letter fluency)	**EUROPE** *Britain*: Halari et al. 2005* (category fluency); *Sweden*: SB Maitland et al. 2004 **LATIN AMERICA** *Brazil*: Carnero et al. 1999 **NORTH AMERICA** *Canada*: Kimura & Hampson 1994 (articulation in tongue twisters); Crossley et al. 1997* (elderly, letter fluency); *United States*: Hobson 1947 (young); Veroff 1980 (ages 55-84, WAIS-R); HW Gordon & Lee 1986* (categorizing words); Bolla et al. 1990 (ages 39-89, controlled oral word association test); Monsch et al. 1992; Berenbaum et al. 1995; Lezak 1995; Stumpf 1995; Loring-Meier & Halpern 1999 (college)	**EUROPE** *Britain*: Trudgill 1972 (grammar) **NORTH AMERICA** *United States*: Terman et al. 1925; Fischer 1958 (grammar); Levine & Crocket 1966 (grammar); Shuy et al. 1967 (grammar); Anshen 1969 (grammar); Wolfram 1969 (grammar, Blacks); Gaddes & Crockett 1975; AL Benton & Hamsher 1978; Yeudall et al. 1986 (written); Ruff et al. 1996 (ages 16-70, controlled oral word association test)

5.2.2.14a. Verbal (Linguistic) Intelligence (Prepubertals)

A major component of all standardized intelligence tests surrounds the ability to understand language. In these tests, this ability is often assessed by reading a paragraph or two to subjects (or having them read the passage themselves), and then having them answer a series of questions regarding the passage. Such a large number of studies of verbal intelligence (VIQ) have been published that Table 5.2.2.14 has been split into three split-tables, one for prepubertals and the other two for postpubertals.

As one can see by viewing Split-Table 5.2.2.14a, few studies of verbal intelligence have attempted to use subjects under the age of 5 or 6. Those that have done so have nearly always either found no gender differences or females surpassing males in average scores. Among school age children, most studies have failed to reveal any significant gender difference, although a number of studies have done so, with females surpassing males in most cases.

Split-Table 5.2.2.14a. Verbal (linguistic) intelligence (prepubertals).

Nature of Any Difference	Prepubertal		
	Toddler	Early Childhood	Childhood
Males higher		**NORTH AMERICA** *United States*: Anastasi & D'Angelo 1952* (Blacks)	**EUROPE** *Britain*: Dunsdon & Roberts 1955; Dunsdon & Fraser-Roberts 1957*; Brimer 1969* *Germany*: RC Preston 1962 **NORTH AMERICA** *United States*: Gansel 1939; HL Koch 1954 (young); Kagan et al. 1964; NL Corah 1965; Lesser et al. 1965; Klaus & Gray 1968; Rabinowitz & Robe 1968; France 1973
No signif. difference	**NORTH AMERICA** *United States*: T Moore 1967; Lewis et al. 1971a; Reppucci 1971	**ASIA** *Japan*: Hattori 1999:404 **NORTH AMERICA** *United States*: Matheny 1973*; James & Miller 1973	**EUROPE** *Britain*: Emmett 1950*; Cicirelli 1967*; Achenbach 1969*; *Sweden*: Svensson 1971* **NORTH AMERICA** *United States*: B Schiller 1934; Havighurst & Janke 1944; Winitz 1959; Darley & Winitz 1961a*; Parsley et al. 1963; RK Penny 1965; Stevenson & Odom 1965a; Bandura & Harris 1966a; Cicirelli 1967*; Cowan et al. 1967 (young); OL Davis 1967; Rhine et al. 1967; Cohen & Klein 1968; Dickie 1968; Gahagan & Gahagan 1968; Herriot 1968; Achenbach 1969*; JC Masters 1969b; Osser et al. 1969; Palmer & Masling 1969*; Sitkei & Meyers 1969* (PPVT); WC Ward 1969; Williams & Fleming 1969; Mehrabian 1970; Moran & Swartz 1970*; F Ali & Costello 1971; Baldwin et al. 1971; Braun & Klassen 1971* (non-linguistic); H Brown 1971; Eska & Black 1971; Friedrichs et al. 1971; Graves & Koziol 1971; Herder 1971; Hopkins & Bibelheimer 1971; Jeruchimowicz et al. 1971; Lipton & Overton 1971; Milgram et al. 1971; Parisi 1971; Shipman 1971; Shure et al. 1971; Suppes & Feldman 1971; Svensson 1971*; Zern 1971; Harris & Hassemer 1972; Harrison & Nadelman 1972; Hoemann 1972; Kellaghan & MacNamara 1972; McCarver & Ellis 1972; Routh & Tweney 1972; Saltz & Soller 1972; Matheny 1973*; Radin 1973; Lewis & Hoover 1987; JP Boldizar 1991*; NM Robinson et al. 1996; Arffa et al. 1998 **OCEANIA** *New Zealand*: DM Fergusson & Horwood 1997:88; Lynn et al. 2005 (WISC-R, vocabulary subtest, ages 8-9)
Females higher	**NORTH AMERICA** *United States*: FL Goodenough 1928:146; D McCarthy 1930; Clarke-Steward 1973; Matheny & Bruggemann 1973	**NORTH AMERICA** *United States*: ME Smith 1935 (grammar & sentence construction); Jersild & Rirzman 1938; FM Young 1941 (vocabulary & sentence construction); Anastasi & D'Angelo 1952* (Whites)	**EUROPE** *Britain*: Emmett 1949; TJ Crow 1998:1089; *France*: Rouxel 2000; *Scotland*: Willms & Kerr 1987 **MIDDLE EAST** *Israel*: Sharan & Weller 1971 **NORTH AMERICA** *Canada*: Randhawa & Hunt 1987*; Alberta Dept. of Education 1989*; *United States*: LM Terman 1916; LM Terman 1925; FL Goodenough 1927; HS Conrad et al. 1933; JD Heilman 1933 (language usage); Darley & Winitz 1961a* (WISC); AI Gates 1961; Alper 1967 (mentally retarded); Eisenberg et al. 1968; Stevenson et al. 1968; Achenbach 1969* (vocabulary); Sitkei & Meyers 1969* (IPTA); Braun & Klassen 1971* (linguistic); Cotler & Palmer 1971; Penk 1971; Shipman 1972; Vance et al. 1978 (mentally retarded children); Vance 1979 (persons with mental retardation); Stanford Research Institute 1982; Myerberg 1986

5.2.2.14b. Verbal (Linguistic) Intelligence (Postpubertals)

Turning to verbal intelligence among adolescents, most of the research findings have found females surpassing males (Split-Table 5.2.2.14b). Nonetheless, far too many studies have either reported no significant gender difference or that males obtain the highest scores to consider the issue entirely settled.

Split-Table 5.2.2.14b. Verbal (linguistic) intelligence (adolescents).

Nature of Any Difference	Postpubertal
	Adolescent
Males higher	**EUROPE** *Britain*: Emmett 1950*; Dunsdon & Fraser-Roberts 1957*; R Lynn 1992; *Greece*: Fatouros 1972; *Netherlands*: Stinssen 1977; *Scotland*: Lynn & Mulhern 1991 (WISC-R test, age 16); *Sweden*: Stage 1988* **MIDDLE EAST** *Israel*: Lieblich 1985 **NORTH AMERICA** *United States*: Thorndike 1926* (older adolescent); Flanagan et al. 1961*; Dwyer 1976; Backman 1979
No signif. difference	**AFRICA** *South Africa*: Visser 1987 **ASIA** *Singapore*: Lim 1994 **NORTH AMERICA** *United States*: Havighurst & Breese 1947 (young); Trumbull 1953; Wechsler 1958; WS Edmonds 1964; Palmer & Masling 1969*; Moran & Swartz 1970*; Weinberg & Rabinowitz 1970; JP Boldizar 1991*; LG Humphreys et al. 1993 (trivial differences)
Females higher	**EUROPE** *Britain*: Colom & Lynn 2004:80*(general language ability); *Ireland*: Bolger & Kellaghan 1990 **NORTH AMERICA** *Canada*: Randhawa & Hunt 1987*; Alberta Dept. of Education 1989*; *United States*: Thorndike 1926* (young); Book & Meadows 1928 (language comprehension); Herzberg & Lapkin 1954 (verbal reasoning); Flanagan 1961*; Monday et al. 1966/1967; Droege 1967; Dye & Very 1968*; Walberg 1969 (physics class); KP Cross 1971; Backman 1972; Educational Testing Service 1972; American College Testing Program 1977 (college); Sherman & Fennema 1977; Myerberg 1986; A Feingold 1988b (grammar & spelling); Bleecker et al. 1988; Colom & Lynn 2004:80* (general language ability)

Regarding adults and multiple age samples, an even greater amount of mixed findings of sex differences are apparent, making it very difficult to make any generalizations about linguistic intelligence sex differences (Split-Table 5.2.2.14c).

Split-Table 5.2.2.14c. Verbal (linguistic) intelligence (adults and multiple age categories).

Nature of Any Difference	Postpubertal	Multiple Age Categories
	Adult	
Males higher	**ASIA** *Indonesia*: Drenth et al. 1977 (young) **EUROPE** *Britain*: R Lynn 1992* (aptitude tests); *Spain*: Colom et al. 1999 (DAT subtest) **NORTH AMERICA** *United States*: Hobson 1947 (young); Goolishian & Foster 1954 (psychiatric patients); Bayley & Oden 1955 (gifted adults & their spouses); RJ Howell 1955; CR Reynolds et al. 1987 (young); R Lynn 1992* (aptitude tests) **OCEANIA** *Australia*: Liddicoat 1961 (WAIS VIQ)	**ASIA** *China*: Lynn & Dai 1993 (WAIS-R test, ages 16-65) **EUROPE** *Britain*: Rahman et al. 2005 (WAIS-R vocabulary) **INTERNATIONAL** *Multiple Countries*: Loehlin et al. 1978* (information)
No signif. difference	**EUROPE** *Britain*: M Willmott & Brierley 1984 (WAIS); Mellanby et al. 2000:382; *Ireland*: Lynn 1996a; *Spain*: Colom et al. 2004 (university applicants, spatial ability controlled) *Sweden*: Lewin et al. 2001 **LATIN AMERICA** *Dominican Republic*: Imperato-McGinley et al. 1991 **NORTH AMERICA** *Canada*: Moffat et al. 1998 (college); *United States*: RD Norman 1953 (college); Bieri et al. 1958 (college); Sarason & Minard 1962 (college); Koen 1966 (college); Mendelsohn & Griswold 1966 (college); Rosenberg & Sutton-Smith 1966 (college); Mendelsohn & Griswold 1967 (college); Feather 1968 (college); E Marks 1968; Sutton-Smith et al. 1968; Feather 1969b (college); Laughlin 1969 (college); DeFazio 1973 (college); Gladue et al. 1990 (college); Schaie & Willis 1993:53* (young & middle age); Caretta 1997; Salat et al. 1999 (elderly)	**AFRICA** *South Africa*: Owen & Lynn 1993* (Whites & Indians) **EUROPE** *Norway*: Nystrom 1983; *Sweden*: Stage 1988* **NORTH AMERICA** *United States*: Inglis & Lawson 1984; Matarazzo et al. 1986; Kaufman et al. 1995*; Reese et al. 2001
Females higher	**EUROPE** *Britain*: Fitt & Rogers 1950 (college); Coltheart et al. 1975 (college); *Sweden*: Herlitz et al. 1997; Herlitz et al. 1999 **NORTH AMERICA** *Canada*: Chipman & Kimura 1998; Kimura & Clarke 2002 (college); *United States*: Gilliland & Clark 1939 (young); Kuznets & McNemar 1940:211 (young); J Stroud & Lindquist 1942 (young); BG Rosenberg & Sutton-Smith 1964 (college); Very 1967 (college); Dye & Very 1968*; Rosenberg & Sutton-Smith 1969 (college); JE Blum et al. 1972 (elderly); Notman & Nadelson 1973 (young); Jarvik 1975 (elderly); D Cohen et al. 1977a; DesRosiers & Ivison 1988 (young); JH Kramer et al. 1988 (young); Pearson & Ferguson 1989 (college); Wilder & Powell 1989 (college); Ganguli et al. 1991 (elderly); Reite et al. 1993; Schaie & Willis 1993:53* (elderly); Basso et al. 2000 (young); RN Jones & Gallo 2002:554 (elderly); Kittler et al. 2004:119 (mentally retarded)	**EUROPE** *Netherlands*: Born & Lynn 1994 (WISC-R, coding & digit span subtests, ages 6-16); *Scotland*: Lynn & Mulhern 1991 (WISC-R, coding & digit span subtests, ages 6-16) **MIDDLE EAST** *Turkey*: Halpern & Tan 2001 (rapid word knowledge) **NORTH AMERICA** *United States*: Miele 1958; Matarazzo 1972 **INTERNATIONAL** *Multiple Countries*: Loehlin et al. 1978* (matching)

5.2.2.15. Verbal Skills (Verbal Communication Ability)

Gender differences in the ability to use language to communicate clearly have been investigated in numerous studies. As shown in Table 5.2.2.15, nearly all studies have concluded that females surpass males in performing these skills. Such a pattern is inconsistent with a meta-analysis that concluded that there is essentially no sex difference in verbal ability (Hyde & Lynn 1988).

Table 5.2.2.15. Verbal skills (verbal communication ability).

Nature of Any Difference	Prepubertal				Postpubertal		Multiple Age Categories
	Infant	Toddler	Early Childhood	Childhood	Adolescent	Adult	
Males more mature		**NORTH AMERICA** *United States*: Anastasi & D'Angelo 1952* (Blacks)				**NORTH AMERICA** *Canada*: McKelvie & Rohrberg 1978	
No signif. difference		**NORTH AMERICA** *United States*: ME Smith 1926*					
Females more mature	**NORTH AMERICA** *United States*: Irwin & Chen 1946	**NORTH AMERICA** *United States*: Doran 1907*; CD Mead 1916*; ME Smith 1926*; D McCarthy 1930*; MS Fisher 1934; Anastasi & D'Angelo 1952* (Whites)	**NORTH AMERICA** *United States*: D McCarthy 1930*; Wellman et al. 1931; F Goodenough 1934; IP Davis 1938; Jersild & Ritzman 1938; Beller & Neubauer 1963	**NORTH AMERICA** *United States*: Doran 1907*; LM Terman 1925; LaBrant 1933; ME Smith 1935; Kopel & Geerded 1942; McNemar 1942:50-53; Shire 1945; AW Mills 1947; D McCarthy 1930; Templin 1957; Bentzen 1963; Garvey & Dickstein 1970	**NORTH AMERICA** *United States*: Backman 1979:263	**EUROPE** *Britain*: Rugg 1995 (young) **NORTH AMERICA** *Canada*: Kimura & Harshman 1984 (less impaired when left hemisphere was damaged); *United States*: Fischer 1958 (young); S Levine 1966 (young); Shuy et al. 1968 (young); Wolfram 1969 (young); RF Priest et al. 1977 (military cadets); Reite et al. 1993 (college); Majeres 1997 (young)	**NORTH AMERICA** *United States*: Bolla-Wilson & Bleeker 1986; JH Kramer et al. 1997

5.2.2.16. Vocabulary Skills (Verbal, Linguistic)

Most studies of vocabulary skills have concluded that males surpass females, especially in comprehension (Table 5.2.2.16).

Table 5.2.2.16. Vocabulary skills (verbal, linguistic).

Nature of Any Difference	Prepubertal	Postpubertal
	Childhood	Adolescent
Males higher	**EUROPE** *Britain*: Dunsdon & Fraser Roberts 1957 (recognition, comprehension, orally tested); WH King 1959* (recognition, comprehension, orally tested); OC Sampson 1959 (recognition, comprehension, orally tested); Brimer 1969 (recognition, comprehension, orally tested) **NORTH AMERICA** *United States*: Dow 1953 (recognition, comprehension, orally tested); Hampleman 1955 (recognition, comprehension, orally tested); Hollow 1955 (recognition, comprehension, orally tested); Templin 1957 (recognition, comprehension, orally tested); J Roberts 1971:8 (in the 1960s); J Roberts 1972:6 (in the 1960s)	**NORTH AMERICA** *United States*: Scanlon 1973:6 (1960s)
No signif. difference		**NORTH AMERICA** *United States*: BA Gladue et al. 1990 (Shipley-Hantford vocabulary test)
Females higher	**EUROPE** *Britain*: WH King 1959* (tested with reading)	

5.2.2.17. Word Defining Ability

Closely related to the extensiveness of one's vocabulary is the ability to provide correct definitions to words. The two studies that have investigated possible gender differences in this ability are not in agreement about these differences (Table 5.2.2.17).

Table 5.2.2.17. Word defining ability.

Nature of Any Difference	Prepubertal	Postpubertal
	Childhood	Adolescent
Males better	**NORTH AMERICA** *United States*: Nakamura & Finck 1973* (difficult similes)	**NORTH AMERICA** *United States*: Hobson 1947
No signif. difference		**NORTH AMERICA** *United States*: Havighurst & Breese 1947; WO Shepard 1970* (simple words)
Females better	**NORTH AMERICA** *United States*: Nakamura & Finck 1973* (easy similes)	**NORTH AMERICA** *United States*: WO Shepard 1970* (complex words)

5.2.2.18. Writing Ability

The ability to write is another aspect of linguistic ability that has been investigated with respect to gender differences. As shown in Table 5.2.2.18, most of the research has concluded that females are better at writing than are males, except in the case of two studies conducted among full adults, where the opposite conclusion was reached.

Table 5.2.2.18. Writing ability.

Nature of Any Difference	Prepubertal	Postpubertal	
	Childhood	Adolescent	Adult
Males better			**NORTH AMERICA** *United States*: Mulac et al. 1990 (written impromptu essays, longer sentences)
No signif. difference			
Females better	**EUROPE** *Germany*: Cohn & Dieffenbacher 1911 (longer & more complex sentences) **NORTH AMERICA** *United States*: US Dept. of Education 1997 **OCEANIA** *New Zealand*: DM Fergusson & Horwood 1997:87 (young, teacher rated)	**NORTH AMERICA** *United States*: LaBrant 1933 (more words); Stalnaker 1941 (essay); Wesman 1949; Applbee et al. 1990; LB Jenkins & Mullins 1990; Hedges & Nowell 1995; US Department of Education 1997	

5.2.3. Creativity/Artistic Ability

A number of studies have sought to determine if gender differences are detectable regarding creativity and artistic talents.

5.2.3.1. Creativity in General

Are males or females more creative? Obviously, the very nature of creativity makes any standardized measurement dubious. Table 5.2.3.1 shows that three studies among school age children all concluded that boys were more creative than girls. For older age groups, however, results have been quite mixed.

Table 5.2.3.1. Creativity in general.

Nature of Any Dif-ference	Prepubertal		Postpubertal		Multiple Age Categories
	Early Childhood	Childhood	Adolescent	Adult	
Males more		**NORTH AMERICA** *United States*: Torrance 1962; Rabinowitz & Robe 1968:628; Kogan & Morgan 1969:119 (responses to creative intellectual task)	**NORTH AMERICA** *United States*: JP Guilford et al. 1961		**NORTH AMERICA** *United States*: GF Miller 1999 (musical & other artistic productions)
No signif. difference		**NORTH AMERICA** *United States*: Torrance 1962; Greenberger et al. 1971	**NORTH AMERICA** *United States*: Feldhusen & Denny 1965	**NORTH AMERICA** *United States*: Schroth & Lund 1994 (college); Stricker et al. 2001 (college students taking the GRE)	**NORTH AMERICA** *United States*: Alpaugh & Birren 1975; Reese et al. 2001* (word association test)
Females more	**NORTH AMERICA** *United States*: Tonyan & Howes 2003:138 (teacher assessed)		**NORTH AMERICA** *United States*: Barrett 1950	**NORTH AMERICA** *Canada*: KS Bowers & van der Meulen 1970 (college, objective test)	

5.2.3.2. Drawing Ability

Studies of gender differences in drawing ability have been focused on school aged children. Most of these studies have concluded that females exhibit greater drawing ability than do males (Table 5.2.3.2).

Table 5.2.3.2. Drawing ability.

Nature of Any Difference	Prepubertal
	Childhood
Males better	**EUROPE** *Britain*: C Burt 1921
No signif. difference	
Females better	**ASIA** *Japan*: MV Cox et al. 2001* **EUROPE** *Britain*: MV Cox et al. 2001* **NORTH AMERICA** *United States*: Willsdon 1977; MV Cox 1993

5.2.3.3. Musical Ability

Musical ability has to do with varying capacities of individuals to appreciate and to produce musical renditions. The limited amount of research on sex differences in musical ability has concluded that there are either no significant differences or that females have more musical ability than do males (Table 5.2.3.3).

Table 5.2.3.3. Musical ability.

Nature of Any Difference	Prepubertal	Postpubertal	
	Childhood	Adolescent	Adult
Males more			
No signif. difference	**NORTH AMERICA** *United States*: Farnsworth 1931	**NORTH AMERICA** *United States*: Farnsworth 1934	
Females more			**NORTH AMERICA** *United States*: Gilbert 1940 (young); GM Gilbert 1942 (young)

5.2.4. Spatial/Mathematical Ability

Spatial/mathematical reasoning refers to a set of cognitive processes in which individuals mentally manipulate images of objects, abstract symbols (especially numbers), or relationships between objects and symbols so as to make logical deductions about them. The abilities one has to perform these tasks are prominent elements in many tests of intelligence and of other measures of cognitive ability.

5.2.4.1a. Spatial Reasoning Ability in General (Prepubertal Humans)

Unlike most aspects of human intellectual ability, spatial reasoning has little to do with language other than the initial instructions given to subjects concerning how to proceed with the tasks they are to perform. Spatial reasoning basically involves mentally manipulating objects or representing objects in one's mind in order to "see" them from different angles or perspectives. Some spatial reasoning tasks involve the mental manipulation of two dimensional (2D) objects while others involve even more complex three dimensional (3D) objects; other studies involve both two and three dimensional types of objects.

A very large number of studies have been conducted on sex differences in spatial reasoning since around the turn of the 20th Century – so much so that the results are presented in several Split-Tables. Regarding prepubertal subjects, Split-Table 5.2.4.1a shows that most studies have found males surpassing females in spatial reasoning tasks, although a considerable number of studies have revealed no significant sex difference.

Split-Table 5.2.4.1a. Spatial reasoning ability in general (prepubertal humans).

Nature of Any Difference	Prepubertal			
		Toddler	Early Childhood	Childhood
Males better			**NORTH AMERICA** *United States*: Young 1920*; McGinnis 1929; JM Connor & Serbin 1977; Rosser et al. 1984; Kerns & Berenbaum 1991*; McGuinness & Morley 1991 (3D); Livesay & Intili 1996 (age 4); Levine et al. 1999* (age 3) **OCEANIA** *Australia*: Livesey & Parkes 1995* (Kinesthetic Activity Test); Livesey & Intili 1996* (Kinesthetic Activity Test)	**EUROPE** *Britain*: Emmett 1949; *France*: Chateau 1959*; *Germany*: Cohn & Dieffenbacher 1911; Wagner 1913; Quaiser-Pohl 2001; *Norway*: L Vederhus & Krekling 1996 (3D) **NORTH AMERICA** *United States*: Burt & Moore 1912; Porteus 1918; Young 1920*; Easby-Grave 1924; Lewerenz 1928*; B Schiller 1934; McNemar 1942:50-53; Havighurst & Breese 1947; Singer et al. 1968* (Wallen pegboard, maze drawing); Keogh 1971*; J Roberts 1971:3; J Roberts 1972:6; Metzler & Shepard 1974; Etaugh & Turton 1977; AW Siegel & Schadler 1977 (3D); Grossi et al. 1979; Liben & Golbeck 1980 (water level task); PG Richmond 1980* (figures, flags, cards); Orsini et al. 1981a; LK Miller & Santoni 1986*; ES Johnson & Meade 1987 (young); KA Kerns & Berenbaum 1991* (2D, 3D); NM Robinson et al. 1996; Subrahmanyam & Greenfield 1996 (in playing video games); Vederhus & Krekling 1996; Levine et al. 1999* **OCEANIA** *Australia*: Richmond 1980* (figures, flags, cards); *New Zealand*: Lynn et al. 2005 (WISC-R, object assembly, block design, ages 8 & 9)
No signif. difference		**NORTH AMERICA** *United States*: JA Hicks 1931; Wieg 1932	**NORTH AMERICA** *United States*: E McGinnis 1929; Eigler 1932; ML Mattson 1933; McGuinness & Morley 1991 (2D puzzle)	**EUROPE** *Norway*: L Vederhus & Krekling 1996 (2D) **NORTH AMERICA** *Canada*: GM Grimshaw et al. 1995a (2D); Choi & Silverman 2003; *United States*: RJ Clinton 1930; Perl 1934; Gray & McDaniel 1974 (no mental rotation involved); SC Nash 1975*; Richmond 1980* (no mental rotation involved) **OCEANIA** *Australia*: Richmond 1980* (hidden figures and copying) **INTERNATIONAL** *Multiple Countries*: HA Witkin et al. 1974:24
Females better				**NORTH AMERICA** *United States*: Singer et al. 1968* (Graham blocks)

5.2.4.1b. Spatial Reasoning Ability in General (Adolescent Humans)

In the case of adolescents, nearly all of the studies suggest that males are more capable at nearly all types of spatial reasoning tasks than are females (Split-Table 5.2.4.1b).

Split-Table 5.2.4.1b. Spatial reasoning ability in general (adolescent humans).

Nature of Any Difference	Postpubertal
	Adolescent
Males better	**AFRICA** *South Africa*: K Owen & Lynn 1993* **ASIA** *Japan*: VA Mann et al. 1990* **EUROPE** *Britain*: WC Emmett 1949; TL Hilton & Berglund 1974; R Wood 1976; Jahoda 1979; R Lynn 1992* (aptitude tests); *Croatia*: M Zivicnjak et al. 2001 (visual discrimination); *France*: Andrieux 1955 (Gottschalt figures test); Chateau 1959*; *Portugal*: Almeida 1989; *Scotland*: Lynn & Mulhern 1991 (WISC-R, object assembly, picture completion) **MIDDLE EAST** *Israel*: Kali & Orion 1996 **NORTH AMERICA** *Canada*: Hakstian & Cattell 1975:303; Loranger et al. 2000; Gierl et al. 2003:295; *United States*: Young 1920; Lewerenz 1928*; Batalla 1936; Havighurst & Breese 1947; Hobson 1947 (young); Wesman 1949; Trumbull 1953; Herzberg & Lapkin 1954; Flanagan et al. 1961; Stafford 1961; Droege 1967; Backman 1972; Scanlon 1973; J Goldberg & Meredith 1975; SC Nash 1975*; Wattanawaha 1977; Sherman 1978 (high school math students); Backman 1979; Vance et al. 1979; Connor & Serbin 1980; Samuel 1983; Caplan et al. 1985* (pre-test); Jamison & Signorella 1986; A Feingold 1988 (teens); Feingold 1988 (DAT space relations); Kalichman 1988a (water level); Gallagher 1989 (gifted); Stumpf & Klieme 1989; VA Mann et al. 1990*; Gallagher & Johnson 1992 (gifted); R Lynn 1992* (aptitude tests); LG Humphreys et al. 1993:255; Law et al. 1993; Stumpf 1993; MB Casey et al. 1995; Stumpf & Eliot 1995 **OCEANIA** *Australia*: Pattison & Grieve 1984 (2D & 3D problems)
No signif. difference	**NORTH AMERICA** *United States*: WJ Meyer & Bendig 1961; Sherman & Fennema 1977; Caplan et al. 1985* (post-test)
Females better	**ASIA** *Japan*: Mann et al. 1990* (WAIS digit symbol) **NORTH AMERICA** *United States*: Mann et al. 1990* (WAIS digit symbol)

5.2.4.1c. Spatial Reasoning Ability in General (Adult Humans)

Turning to adults, Split-Table 5.2.4.1c shows that most studies have revealed a male advantage in spatial reasoning, very few have found a female advantage, but several have failed to find a significant gender difference.

Split-Table 5.2.4.1c. Spatial reasoning ability in general (adult humans).

Nature of Any Difference	Postpubertal
	Adult
Males better	**AFRICA** *Ghana*: Amponsah & Krekling 1997* (water level task) **ASIA** *China*: Geary & DeSoto 2001*; *Japan*: I Silverman et al. 1996* (young) **EUROPE** *Britain*: Coltheart et al. 1975 (college); CJ Hamilton 1995 (college, 3D); Furnham & Rawles 1999 (young, 3D); Rahman & Wilson 2003; *Ireland*: Lynn 1996:650 (college); *Italy*: Vecchi & Girelli 1998; *Spain*: Colom et al. 1999 (DAT subtest); Contreras et al. 2001; Colom et al. 2004 (university applicants, dynamic spatial performance test); *Norway*: Amponsah & Krekling 1997* (water level task); Nordvik & Amponsah 1998 (college, technology and social science majors); *Sweden*: Herlitz et al. 1997; Lewin, et al. 2001 (3D); JE Yonker et al. 2005 (elderly) **MIDDLE EAST** *Israel*: JC Loehlin et al. 1978 (3D) **NORTH AMERICA** *Canada*: RD Bock 1973; Tapley & Bryden 1977; Voyer & Bryden 1990; CM McCormick & Felson 1991; NV Watson & Kimura 1991(viewfinding task); Galea & Kimura 1993 (college); M Peters et al. 1996 (college, 3D); I Silverman et al. 1996* (young); D Voyer 1996a (college, 3D); Voyer 1997; SD Moffat et al. 1998 (college, 3D); Moffat & Hampson 2000 (2D); Voyer & Sullivan 2003 (college); Voyer et al. 2004 (college); *United States*: Myers 1913; Young 1920; Witkin 1949; Barratt 1955; Corah 1965; AD Davies 1965; AH Kidd & Cherymisin 1965 (college); Very 1967 (college); Shepard & Metzler 1971; MJ Allen 1974 (young); D Cohen et al. 1977a (elderly, 2D); Ridgeway 1977 (college, hidden figures test); Lips et al. 1978; MJ Allen & Hogeland 1978; SG Vandenberg & Kruse 1978 (3D); Kail et al. 1979; RJ Freedman & Rovegno 1981 (college); Bryant 1982 (college, 3D); Jardine & Martin 1983 (college); Newcombe et al. 1983; TR Lord 1985 (college, 2D); HW Gordon & Lee 1986 (localization & orientation); Meehan & Overton 1986 (young); LK Miller & Santoni 1986*; S Willis & Schaie 1988 (elderly); KF Cochran & Wheatley 1989 (college); JL Pearson & Ferguson 1989 (college, 3D); Signorella et al. 1989 (college, 2D); Beatty & Duncan 1990 (young, 3D); Resnick 1993; Schaie & Willis 1993 (young & full); Snyder & Harris 1993; Lawton 1994 (young, 3D); Roig & Cicero 1994 (young, line bisection); M Robert & Ohlmann 1994 (water level); Sharps et al. 1994 (college, 2D); Gladue & Bailey 1995a (college, 3D); Hedges & Nowell 1995; O'Boyle et al. 1995 (college); Parameswaran 1995* (college); Prinzel & Freeman 1995 (college, 3D); Saccuzzo et al. 1996; I Silverman et al. 1996* (college, 3D); Caretta 1997 (young); Janowsky et al. 1998 (card rotation); MS Masters 1998; LS Hamilton 1999; Lawton & Morrin 1999 (young, 3D); Geary et al. 2000 (young, 3D); Sholl et al. 2000 (compass orientation task); Voyer et al. 2000 (college, 3D); Geary & DeSoto 2001*; Kerkman et al. 2000 (college, 3D); Shea et al. 2001; Levine & Stern 2002 (college, water level); McFadden & Shubel 2003 (college) **INTERNATIONAL** *Multiple Countries*: McGue & Bouchard 1989 (3D); I Silverman et al. 1996* (college, 2D)
No signif. difference	**LATIN AMERICA** *Dominican Republic*: Imperato-McGinley et al. 1991 (digit symbol, picture arrangement) **NORTH AMERICA** *Canada*: SJ McKelvie & Rohrberg 1978 (college, 2D); Walker & Krasnoff 1978 (college, U-tube test); Moffat et al. 1998 (college); *United States*: Mefferd et al. 1969 (young, line bisection); Brissett & Nowicki 1973 (college); JL Bradshaw et al. 1985 (college, line bisection); KF Cochran & Wheatley 1989 (college); Ganguli et al. 1991 (elderly); CM McCormick & Felson 1991 (WAIS digit symbol); Schaie & Willis 1993 (elderly); MJ Sharps et al. 1994 (college, 3D); Luh 1995 (college, line bisection); Parameswaran 1995* (after training); Brodie & Pettigerw 1996 (college, line bisection); Hausmann et al. 2002 (college, line bisection) **OCEANIA** *Australia*: Liddicoat 1961 (digit symbol, picture arrangement)
Females better	**EUROPE** *Belgium*: Declerck & De 2002 (Poggendorff illusion) **NORTH AMERICA** *Canada*: Galea & Kimura 1993 (college); *United States*: SL Ward et al. 1986 (college); Lawton 1994 (college)

It is interesting to juxtapose findings cited in the above split-tables with conclusions reached by earlier literature reviews surrounding sex differences in spatial reasoning. Some of these earlier reviews have concluded that the findings of any sex differences are too inconsistent and/or too small to warrant a definitive conclusion (Fairweather 1976; Sherman 1978; Hyde 1981; Caplan et al. 1985), while other reviewers have suggested that substantial differences favoring males do exist, especially following the onset of puberty (Burnett 1986; Roberts & Pennebaker 1995:159). Still other reviewers have asserted that it is only in regard to the most demanding forms of spatial reasoning that male advantages are consistently detected (Linn & Petersen 1985; Feingold 1988b; Voyer et al. 1995). The present review supports the view that a significant male advantage in most forms of spatial reasoning is found worldwide, especially during adolescence.

5.2.4.1d. Spatial Reasoning Ability in General (Multiple Age Categories, Humans)

In the case of adolescents and adults, most of the studies suggest that males are more capable at nearly all types of spatial reasoning tasks than are females, although a substantial proportion of the studies have concluded that no significant gender difference exists (Split-Table 5.2.4.1d).

It is interesting to consider the conclusions reached by earlier literature reviews surrounding sex differences in adolescent and/or adult spatial reasoning. Some have concluded that the findings of any sex differences are too inconsistent and/or too small to warrant a definitive conclusion (Fairweather 1976; Sherman 1978; Hyde 1981; Caplan et al. 1985), while other reviewers have suggested that substantial differences favoring males do exist, especially following the onset of puberty (Burnett 1986; Roberts & Pennebaker 1995:159). Still other reviewers have asserted that it is only in regard to the most demanding forms of spatial reasoning that male advantages are consistently detectable (Linn & Petersen 1985; Feingold 1988b; Voyer et al. 1995). The present review supports the view that a slight male advantage in most forms of spatial reasoning is found worldwide.

Split-Table 5.2.4.1d. Spatial reasoning ability in general (multiple age categories, humans).

Nature of Any Difference	Multiple Age Categories
Males better	**AFRICA** *South Africa*: Owen & Lynn 1993* (Blacks, Indians, Whites) **EUROPE** *Netherlands*: Born & Lynn 1994 (WISC-R, picture completion, picture arrangement, object assembly, ages 6-16) **NORTH AMERICA** *Canada*: Voyer et al. 1995; Voyer & Saunders 2004; *United States*: Porteus 1919 (Porteus maze test); Stafford 1961 (identical blocks test); Witkin et al. 1967; Dorfman 1977; LJ Harris 1978; Loehlin 1978; Vandenberg & Kruse 1978; CR Reynolds 1980; Inglis & Lawson 1984; Matarazzo et al. 1986; Feingold 1988 (DAT space relations subset); Kaufman et al. 1995; Vecchi & Girelli 1998; Sholl et al. 2000; Vecchi 2001 (sighted and blind, 2D, 3D) **INTERNATIONAL** *Multiple countries*: Berry 1966*; Loehlin et al. 1978* (2D)
No signif. difference	**ASIA** *Japan*: Fukatsu et al. 1990 (line bisection) **NORTH AMERICA** *United States*: Berry 1966* (Inuets); Scarisbrick et al. 1987 (line bisection); AD Milner et al. 1992 (line bisection); Chokron & Imbert 1993 (line bisection) **OCEANIA** *Australia*: Liddicoat 1961 (WAIS object assembly)
Females better	**ASIA** *China*: Lynn & Dai 1993 (WAIS-R, digit symbol, ages 16-65) **EUROPE** *Britain*: C Spencer & Weetman 1981 **NORTH AMERICA** *United States*: HK Wolfe 1923 (line bisection); Hausmann et al. 2002 (using left hand, line bisection)

5.2.4.1e. Spatial Reasoning Ability in General (Nonhumans)

A few studies have investigated spatial reasoning ability of nonhumans. As shown in Split-Table 5.2.4.1e, these studies have all concluded that males are better at spatial reasoning tasks than are females.

Split Table 5.2.4.1e. Spatial reasoning ability in general (nonhumans).

Nature of Any Difference					Postpubertal		Multiple Age Categories
						Adult	
Males better						**BIRD** *Chicken*: Vallortigara 1996 (spatial discrimination and learning) **PRIMATE (EXCEPT APE)** *Rhesus Monkey*: Lacreuse et al. 1999 **RODENT** *Meadow Vole*: Gaulin & Fitzgereld 1989; Kavaliers et al. 1998; *Rat*: R Joseph et al. 1978	**PRIMATE (EXCEPT APE)** *Rhesus Monkey*: Lacreuse et al. 2005 (spatial memory)
No signif. difference							
Females better							

5.2.4.2. Variability in Spatial/Math Abilities

A few studies have concluded that especially in the upper, rather than the lower range of spatial and math reasoning, males exhibit greater variability than is the case for females (Table 5.2.4.2).

Table 5.2.4.2. Variability in spatial/math abilities.

Nature of Any Difference	Postpubertal
	Adolescent
Males more	**EUROPE** *Britain*: Strand et al. 2006 (11-12 year olds) **NORTH AMERICA** *United States*: Stanley & Benbow 1982 (upper range); Freed 1983 (upper range); Benbow 1988 (upper range); Hedges & Freidman 1993:97
No signif. difference	
Females more	

5.2.4.3. Change in Spatial Reasoning Ability With Age

Spatial reasoning tends to deteriorate with age. One study of rats concluded that this deterioration was greater in the case of males than in the case of females (Table 5.2.4.3).

Table 5.2.4.3. Change in spatial reasoning ability with age.

Nature of Any Difference	Postpubertal
	Adult
Males deteriorate more	**RODENT** *Rat*: Lukoyanov et al. 1999 (Morris water maze)
No signif. difference	
Females deteriorate more	

5.2.4.4. Estimating Trajectories

Some spatial reasoning tasks require subjects to estimate where objects will land that are being thrown or projected at a specified velocity. In all of the limited number of studies of these estimates, males have been shown to make more accurate estimates than do females (Table 5.2.4.4).

Table 5.2.4.4. Estimating trajectories.

Nature of Any Difference	Prepubertal	Postpubertal	
	Childhood	Adolescent	Adult
Males better	**AFRICA** *Ghana*: Amponsah 2000* **EUROPE** *Norway*: Amponsah 2000*	**ASIA** *China*: Huang 1993	**NORTH AMERICA** *Canada*: Hall & Kimura 1995; *United States*: MK Kaiser et al. 1985; MK Kaiser et al. 1986; Schiff & Oldak 1990; Kalichman 1991; D Law et al. 1993
No signif. difference			
Females better			

5.2.4.5. Performance IQ

Performance IQ (PIQ) refers to all of the components of a standardized test of intelligence other than those pertaining to language or verbal skills (VIQ). Most of these PIQ components have to do with spatial reasoning. As shown in Table 5.2.4.5, most studies have found that males score significantly higher than do females on PIQ components of standardized IQ tests.

Table 5.2.4.5. Performance IQ.

Nature of Any Difference	Prepubertal				Postpubertal		Multiple Age Categories
				Childhood	Adolescent	Adult	
Males better				**NORTH AMERICA** *United States*: Vance et al. 1978 (persons with mental retardation)	**AFRICA** *South Africa*: Visser 1987; Macleod 1995 **EUROPE** *Britain*: R Lynn 1992; *Greece*: Fatouros 1972; *Netherlands*: Stinssen 1977; *Sweden*: Stage 1988 **MIDDLE EAST** *Israel*: Lieblich 1985 **NORTH AMERICA** *United States*: Flanagan 1961; Rosenberg & Sutton-Smith 1966 (college); Droege 1967; Rosenberg & Sutton-Smith 1969 (college); Walberg 1969 (HS physics students); Backman 1972; DP Keating & Stanley 1972 (gifted); American College Testing Program 1977 (college); Fennema & Sherman 1977:62; McDermott et al. 1989; Gallagher & De Lisi 1994 (high IQ students); SM Strauss & Subotnik 1994; Holland & McDermott 1996; Voyer 1996a; Nyangeni & Glencross 1997; Wilhoit & McCallum 2002:276 **INTERNATIONAL** *Several Western Countries*: Keeves 1973:56*; Beller & Gafni 1996 (young)	**ASIA** *Indonesia*: Drenth et al. 1977 (young) **EUROPE** *Britain*: M Willmott & Brierley 1984 (WAIS); *Estonia*: Allik et al. 1999 **NORTH AMERICA** *United States*: Goolishian & Foster 1954* (psychiatric patients); Bieri et al. 1958 (college); Very 1967 (college); CR Reynolds et al. 1987 (young); Kittler et al. 2004:119 (persons with mental retardation) **INTERNATIONAL** *Several Western Countries*: Keeves 1973:56*	**ASIA** *China*: Lynn & Dai 1993 (WAIS-R test, ages 16-650 **EUROPE** *Norway*: Nystrom 1983 **NORTH AMERICA** *United States*: Kaufman & McLean 1988:236 (except digit symbol)
No signif. difference				**NORTH AMERICA** *United States*: HL Koch 1954 (young); Gainer 1962; Cicirelli 1967 (White); Lahademe 1967 (6th graders) **OCEANIA** *New Zealand*: DM Fergusson & Horwood 1997; Lynn et al. 2005 (WISC-R test, ages 8 & 9)	**EUROPE** *Scotland*: Lynn & Mulhern 1991 (WISC-R test, age 16) **NORTH AMERICA** *United States*: Wechsler 1958; Rosenberg & Sutton-Smith 1964 (college); Sutton-Smith et al. 1968 (college)	**NORTH AMERICA** *United States*: Goolishian & Foster 1954* (psychiatric patients, digital symbol); RJ Howell 1955; Sarason & Minard 1962 (college); LI Jacobson et al. 1970 (college) **OCEANIA** *Australia*: Liddicoat 1961	
Females better							

5.2.4.6. Block Design Ability

Many standardized tests of intelligence provide subjects with blocks with sides of varying colors and then ask subjects to arrange the blocks in patterns within a designated period of time. Rubik's Cube would be a particularly complex, but familiar example of block design tests. These subtests are considered part of the performance aspects of IQ tests. As shown in Table 5.2.4.6, the available research specifically concerning block design test scores indicate that no significant gender difference exists among school aged children, but that following adolescents, males perform noticeably better than females.

Table 5.2.4.6. Block design ability.

Nature of Any Difference	Prepubertal				Postpubertal		Multiple Age Categories
				Childhood	Adolescent	Adult	
Males better				**EUROPE** *The Netherlands*: Born & Lynn 1994* (WISC-R) **OCEANIA** *New Zealand*: Lynn et al. 2005 (WISC-R, ages 8&9)	**EUROPE** *The Netherlands*: Born & Lynn 1994* (WISC-R) *Scotland*: Lynn & Mulhern 1991 (WISC-R test, age 16)	**LATIN AMERICA** *Dominican Republic*: Imperato-McGinley et al. 1991 **NORTH AMERICA** *United States*: Reite et al. 1993; Schroth & Lund 1994 (college); Janowsky et al. 1998 **OCEANIA** *Australia*: Liddicoat 1961 (WAIS Block Design)	**AFRICA** *Sierra Leon*: JW Berry 1966* (ages 10-70) **NORTH AMERICA** *United States*: Miele 1958 **OCEANIA** *New Guinea*: JW Berry 1971* (rural)
No signif. difference				**EUROPE** *Norway*: Vigeland 1973 **NORTH AMERICA** *United States*: Caldera et al. 1999	**NORTH AMERICA** *United States*: Kleinfeld 1970	**AFRICA** *South Africa*: Baran 1971 (Zulu)	**NORTH AMERICA** *United States*: JW Berry 1966* (Inuit of Alaska); JW Berry & Annis 1974* (Carrier Indians) **OCEANIA** *Australia*: JW Berry 1971* (Aborigines); *New Guinea*: JW Berry 1971* (urban) **INTERNATIONAL** *Multiple Countries:* RS MacArthur 1975* (adolescent and adult)
Females better							**NORTH AMERICA** *United* States: JW Berry & Annis 1974* (Cree Indians)

5.2.4.7. Correctly Judging Distances

A couple of studies have investigated gender differences in correctly judging distances. In both cases, males surpassed females in this regard (Table 5.2.4.7).

Table 5.2.4.7. Correctly judging distances.

Nature of Any Difference	Postpubertal
	Adult
Males better	**NORTH AMERICA** *Canada*: NV Watson & Kimura 1991 (college); *United States*: Jardine & Martin 1983 (college)
No signif. difference	
Females better	

5.2.4.8. Embedded Figure Test Performance

How do the sexes compare in locating camouflaged figures in photographs or drawings? Table 5.2.4.8 shows that numerous studies have investigated this question. For children, the findings have not been consistent (Split-Table 5.2.4.8a).

Split-Table 5.2.4.8a. Embedded figure test performance (prepubertals).

Nature of Any Difference	Prepubertal	
	Early Childhood	Childhood
Males better		**LATIN AMERICA** *Mexico*: Mebane & Johnson 1970 **NORTH AMERICA** *United States*: VC Wolf 1971* (6th grade)
No signif. difference	**LATIN AMERICA** *Mexico*: Diaz-Guerrero & Holtzman 1974 (child version)	**NORTH AMERICA** *Canada*: MacArthur 1969 (Inuit of Canada); *United States*: Crudden 1941; Goodenough & Eagle 1963; Karp & Konstadt 1963; Corah 1965; AG Goldstein & Chance 1965 (after training); VC Wolf 1971* (school age children overall); S Johnson 1976 (after training); Connor et al. 1977; JM Connor et al. 1978 (after training); Caldera et al. 1999
Females better	**ASIA** *Japan*: Hattori 1999:404	**NORTH AMERICA** *United States*: Ruebrush & Stevenson 1964

As with children, in the case of adolescents and adults, there is no consistent pattern with respect to any gender difference in performing the embedded figure test (Split-Table 5.2.4.8b).

Split-Table 5.2.4.8b. Embedded figure test performance (postpubertals).

Nature of Any Difference	Postpubertal		Multiple Age Categories
	Adolescent	Adult	
Males better	**NORTH AMERICA** *United States*: VC Wolf 1971* (11th graders); Holtzman et al. 1975* (Hispanics)	**ASIA** *India*: Pande 1970 (college) **EUROPE** *Netherlands*: Wit 1955 (college) **NORTH AMERICA** *Canada*: Newbigging 1954 (college); Harshman & Hampson 1983:160* (college);*United States*: Witkin 1950 (college); Harshman & Hampson 1983:160* (young); Knez & Enmarker 1998 (college) **INTERNATIONAL** *Multiple Countries:* MacArthur 1975*	**AFRICA** *Sierra Leon*: JW Berry 1966*; *South Africa*: Baran 1971 (Zulu); **EUROPE** *France*: Chateau 1959 **LATIN AMERICA** *Mexico*: Witkin et al. 1974* (age 9-15, child version) **NORTH AMERICA** *United States*: Witkin 1949 **OCEANIA** *New Guinea*: JW Berry 1971* (rural)
No signif. difference	**AFRICA** *Zambia*: Siann 1972 **NORTH AMERICA** *Canada*: MacArthur 1967 (Inuit of *Canada*); *United States*: Holtzman et al. 1975* (non-Hispanic, Whites); Signorella & Jamison 1978 (young); Gitelson et al. 1982; Tobin 1982 **INTERNATIONAL** *Multiple Countries:* MacArthur 1975*	**EUROPE** *Britain*: Hamilton 1995 **NORTH AMERICA** *United States*: Pearson & Ferguson 1989 (college)	**AFRICA** *Nigeria*: Okonji 1969 (rural) **EUROPE** *Italy*: Witkin et al. 1974* (ages 9-15, child version); *Netherlands*: Witkin et al. 1974* (ages 9-15, child version) **NORTH AMERICA** *United States*: JW Berry 1966* (Inuit of Alaska) **OCEANIA** *Australia*: JW Berry 1971* (Aborigines); *New Guinea*: JW Berry 1971* (urban)
Females better	**NORTH AMERICA** *United States*: H Witkin et al. 1971 (young); RF McGivern et al. 1997*	**NORTH AMERICA** *Canada*: Kimura & Hampson 1994; RF McGivern et al. 1997*	**NORTH AMERICA** *United States*: Ekstrom et al. 1976

5.2.4.9. Field Independence Test Performance

In field independence tests, subjects are put in a darkened room and asked to perform a task requiring them to put an object (such as a rod or beam of light) into a perfectly vertical position. Studies have found that with the possible exception of school age children and the elderly, males are better able to perform field independent tasks than females (Table 5.2.4.9).

Table 5.2.4.9. Field independence test performance.

Nature of Any Dif-ference	Prepubertal				Postpubertal		Multiple Age Categories
			Early Childhood	Childhood	Adolescent	Adult	
Males more			**EUROPE** *Britain*: Kloner & Britain 1984 **NORTH AMERICA** *United States*: Chynn et al. 1991 (ages 3-5); Busch et al. 1993		**NORTH AMERICA** *United States*: HA Witkin et al. 1967*; Van Leeuwen 1978:89 (generalization)	**NORTH AMERICA** *United States*: Witkin 1949; Bennett 1956; Witkin et al. 1962; Bauermeister et al. 1963; Vaught 1965 (college); Balistreri & Busch-Rossnagel 1989 (college)	**NORTH AMERICA** *United States*: Witkin et al. 1974
No signif. difference				**NORTH AMERICA** *United States*: HA Witkin et al. 1967*; HA Witkin et al. 1971		**NORTH AMERICA** *United States*: SA Karp 1967 (elderly); Schwartz & Karp 1967 (elderly)	
Females more							

5.2.4.10a. Maze Traversing Ability/Maze Learning/Spatial Navigation Ability (Prepubertal Humans)

Split-Table 5.2.4.10a shows that numerous studies have compared the sexes with respect to maze traversing ability and spatial navigation prior to the onset of puberty. While the findings have been somewhat inconsistent, most evidence indicates that males surpass females in this ability.

Split-Table 5.2.4.10a1. Maze traversing ability/maze learning/spatial navigation, humans.

Nature of Any Dif-ference	Prepubertal			
			Early Childhood	Childhood
Males better			**ASIA** *Japan*: Hattori 1999 **EUROPE** *Britain*: Fairweather & Butterworth 1977 **NORTH AMERICA** *United States*: Young 1920*; McGinnis 1929; Wechsler 1967; RS Wilson 1975	**EUROPE** *Britain*: Mellone 1944 **NORTH AMERICA** *United States*: Porteus 1918; Young 1920*; J Roberts 1971:3; J Roberts 1972:2; SC Levine et al. 1999
No signif. difference				**NORTH AMERICA** *United States*: Overman et al. 1996 (radial arm maze) **INTERNATIONAL** *Multiple Countries*: HA Witkin et al. 1974:24
Females better				

5.2.4.10b. Maze Traversing Ability/Maze Learning/Spatial Navigation Ability (Postpubertal Humans)

Virtually all studies of sex differences in maze traversing and spatial navigation ability for postpubertal humans have either concluded that males are faster and more accurate or that there are no significant gender differences (Split-Table 5.2.4.10b).

Split-Table 5.2.4.10b. Maze traversing ability/maze learning/spatial navigation, humans.

Nature of Any Difference	Postpubertal		Multiple Age Categories
	Adolescent	Adult	
Males better	**EUROPE** *Sweden*: Klinteberg et al. 1987 **NORTH AMERICA** *United States*: Young 1920*; Scanlon 1973:6; JR Wilson et al. 1975	**EUROPE** *Finland*: Portin et al. 1995 (elderly, trail-making test) **NORTH AMERICA** *Canada*: NV Watson & Kimura 1991 (young); Galea & Kimura 1993 (college, spatial navigation); Moffat et al. 1998*; I Driscoll et al. 2005 (virtual navigation task); *United States*: Book 1932 (young); Carter-Saltzman 1979 (young); Bever 1992; Law et al. 1993 (young); Devlin & Bernstein 1995; S Schmitz 1997; SD Moffat et al. 1998* (young); Sandstrom et al. 1998 (computerized virtual navigation); Groen et al. 2000 (spatial navigation); Saucier et al. 2002 (spatial navigation)	**EUROPE** *Britain*: Davies 1968 (ages 20-79, trail-making test) **NORTH AMERICA** *United States*: Miele 1958; Sholl et al. 2000 **INTERNATIONAL** *Multiple Countries*: Porteus 1919
No signif. difference	**NORTH AMERICA** *United States*: J Sherman 1979:387	**NORTH AMERICA** *Canada*: Fromm-Auch & Yeudall 1983 (ages 18-64, trail-making test);*United States*: Dodrill 1979 (trail-making test); Heaton et al. 1986 (ages 18-81, trail-making test); Heaton et al. 1991 (ages 20-80, trail-making test); Ivnik et al. 1996 (elderly, trail-making test); Sandstrom et al. 1998* (virtual Morris water maze with no landmarks)	**NORTH AMERICA** *Canada*: Stuss et al. 1987 (ages 16-69, trail-making test); Yeudall et al. 1987 (ages 15-40, trail-making test)
Females better		**NORTH AMERICA** *Canada*: Bornstein 1985 (ages 18-69, trail-making test)	

5.2.4.10c. Maze Traversing Ability/Maze Learning/Spatial Navigation, Nonhumans

Considerable research has been undertaken to determine the cause of gender differences in maze traversing skills in nonhumans, particularly rodents. As shown in Table 5.2.4.10c, most studies indicate that males surpass females in maze traversing abilities.

In at least one study of rats, females were injected with male-typical level of testosterone shortly after birth. These females learned the location of a "safe platform" in a so-called water maze as quickly as did the typical male (Roof et al. 1993). This suggests that at least in rodents, brain exposure to testosterone contributes to maze traversing abilities.

Split-Table 5.2.4.10c. Maze traversing ability/maze learning/spatial navigation, non-humans.

Nature of Any Difference	Prepubertal				Postpubertal		Multiple Age Categories
			Early Childhood	Childhood	Adolescent	Adult	
Males better				**RODENT** *Rat*: Dawson 1972; Stewart et al. 1975; Jost 1983; Rudy et al. 1987; Cimadevilla et al. 1999* (30 days old); Roof 1993; Galea et al. 1994; Kraemer & Randall 1995	**RODENT** *Rat*: Tryon 1931*; Barrett & Ray 1970*; Krasnoff & Weston 1976; WW Beatty 1984	**RODENT** *Meadow Vole*: Gaulin & FitzGerald 1986*; Gaulin & FitzGerald 1989 (symmetrical maze & radial maze); LF Jacobs et al. 1990 (spatial navigation); Gaulin 1992:139* (young); Kavaliers et al. 1993; *Mouse*: Mishima et al. 1986; Kvist & Selander 1987* (young, faster but with no difference in number of errors); Berger-Sweeney et al. 1995 (radial arm maze); Berger-Sweeney et al. 1995 (spatial navigation); Frick & Gresack 2003 (spatial navigation); *Rat*: Hubbert 1915 (young); Tyron 1931*; McNeman & Stone 1932 (young, T maze & Carr maze); Barnes et al. 1966 (young); Barrett & Ray 1970* (young, open maze); Davenport et al. 1970; Dawson 1972; Wong & Judd 1973 (young); J Dawson et al. 1975; J Stewart et al. 1975 (young); Krasnoff & Weston 1976 (young); Joseph et al. 1978; Beatty 1979 (Lashley III, Hebb-Williams, and T mazes); Einon 1980; Joseph & Gallagher 1980; McGee 1982; McGivern et al. 1984 (Lashley 3 maze/spatial task, faster); Mishima et al. 1986 (spacial navigation); Meck et al. 1988 (Arm Radial maze); CL Williams et al. 1990; Means & Dent 1991 (T maze); Roof et al. 1993; Seymoure et al. 1996; ML Forgie & Kolb 1998 (after frontal lobe injury); Sandstrom et al. 1998* (virtual Morris water maze with no landmarks); Bimonte et al. 2000 (water radial arm maze)	**RODENT** *Pine Vole*: Gaulin & Fitzgerald 1986; Sadovnikova-Koltzova 1929; MI Tomilin & Stone 1933; *Rat*: Joseph 1979
No signif. difference					**RODENT** *Rat*: Cimadevilla et al. 1999* (42 days old)	**RODENT** *Mouse*: Kvist & Selander 1987* (young, number of errors); Lamberty & Gower 1988 (spatial navigation); *Pine Vole*: Gaulin & FitzGerald 1986*; Gaulin 1992:139* (young); *Prairie Vole*: Gaulin & FitzGerald 1986* (symmetrical maze); Gaulin & Wartell 1990; *Rat*: Machado-Magalhaes & de Araujo-Canlini 1974; van Haaren et al. 1987; SD Healy et al. 1999 (spatial navigation); Bimonte & Denenberg 2000 (radial arm maze); *Rodents in General*: Kimchi & Terkel 2001:175 (3 species)	**RODENT** *Meadow Vole*: Gaulin & Fitzgerald 1986*
Females better			**RODENT** *Rat*: Krasnoff & Weston 1976 (young)			**RODENT** *Rat*: Corey 1930	

5.2.4.11. Mechanical Problem Solving/Mechanical Ability

From early childhood through adulthood, males have been shown to be better than females in terms of mechanical abilities. This conclusion has been supported by nearly all available research (Table 5.2.4.11).

Table 5.2.4.11. Mechanical problem solving/mechanical ability.

Nature of Any Difference	Prepubertal		Postpubertal		Multiple Age Categories
	Early Childhood	Childhood	Adolescent	Adult	
Males better	**NORTH AMERICA** *United States*: Sylvester 1913*; LB Ames & Learned 1954	**EUROPE** *Germany*: Neubauer 1927 **NORTH AMERICA** *United States*: Burt & Moore 1912; Sylvester 1913*; Young 1916; Porteus 1918; Langhorne 1933b; AW Siegel & Schaddler 1977 (constructing 3-D models)	**EUROPE** *Britain*: R Lynn 1992* (aptitude tests, ages 13-18) **NORTH AMERICA** *Canada*: Hakstian & Cattell 1975:303; *United States*: Sylvester 1913*; Woolley & Fisher 1914; Young 1916*; DG Peterson 1930 (young); Langhorne 1933b; Bennett & Cruikshank 1942; Wesman 1949; JC McGuire 1954 (young); A Feingold 1988; R Lynn 1992* (aptitude tests); JC Stanley et al. 1992	**EUROPE** *Britain*: G Sanders & Ross-Field 1986a (Vincent Mechanical Diagram test); *Spain*: Colom et al. 1999 (DAT subtest) **NORTH AMERICA** *United States*: Young 1916* (college); Bennett & Cruikshank 1941 (college)	**NORTH AMERICA** *United States*: GK Bennett & Cruikshank 1942; Scheinfeld 1944:308
No signif. difference		**NORTH AMERICA** *Canada*: Choi & Silverman 2003	**NORTH AMERICA** *United States*: Janke & Havighurst 1945		
Females better					

5.2.4.12. Mental Rotation

Numerous studies have assessed gender differences in solving mental rotation tasks. Such tasks usually present subjects with drawings of three dimensional objects as viewed from different perspectives, then requiring subjects to match objects that are the same or identify those that are not.

As shown in Split-Table 5.2.4.12a, most studies of children have concluded that males are faster and more accurate than females at mental rotation, although a few studies have failed to find significant sex differences.

Split-Table 5.2.4.12a. Mental rotation (prepubertals).

Nature of Any Difference	Prepubertal	
	Early Childhood	Childhood
Males more accurate or faster	**NORTH AMERICA** *United States*: Rosser et al. 1984; McGuinness & Morley 1991 (three dimensional Lego models)	**EUROPE** *Norway*: Vederhus & Krekling 1996 (older) **NORTH AMERICA** *United States*: Guay & McDaniel 1977; Vandenberg & Kuse 1978; Kerns & Berenbaum 1991; Grimshaw et al. 1995a*
No signif. difference		**MIDDLE EAST** *Pakistan*: Pontius 1997 **NORTH AMERICA** *Canada*: Grimshaw et al. 1995a:94* (young); Choi & Silverman 2003; *United States*: SM Resnick 1993 (no time limit testing)
Females more accurate or faster		

Split-Table 5.2.4.12b suggests that adolescents and adults exhibit an even greater tendency for males to surpass females in mental rotation capabilities. Most of the exceptions either involved subjects who were prepubertals or in which they have no time restraints for completing the task (D Goldstein et al. 1990; Resnick 1993, but see MS Masters 1998). Another study was able to eliminate the male advantage in accurate mental rotation by providing females with extensive coaching and practice prior to testing (JE Roberts & Bell 2000).

Split-Table 5.2.4.12b. Mental rotation (postpubertals).

Nature of Any Difference					Postpubertal		Multiple Age Categories
					Adolescent	Adult	
Males more accurate or faster					**NORTH AMERICA** *United States*: Hines 1990; MS Masters & Sanders 1993*; Stumpf 1993; Stumpf & Eliot 1995	**AFRICA** *Ghana*: Amponsah & Krekling 1997* (three-dimension task, two-dimension task); Amponsah & Krekling 1997* (college); *Zimbabwe*: Mayes et al. 1988* (reproduction of design with blocks) **EUROPE** *Austria*: Doppelmayr et al. 2002:293; *Britain*: Neave et al. 1999; Halari et al. 2005 (young); Rahman et al. 2005; *Germany*: Jordan et al. 2002 (college); *Hungary*: Karadi et al. 1999; Karadi et al. 2003 (young); Halari et al. 2005 (young); *Norway*: Amponsah & Krekling 1997* (three-dimension task, mental two-dimension task); Amponsah & Krekling 1997* (college); Nordvik & Amponsah 1998 (college, technology and social science majors); *Scotland*: Mayes et al. 1988* (reproduction of design with blocks); *Spain*: Colom et al. 1999 (college, PMA subtest); *Sweden*: Herlitz et al. 1999 (young) **MIDDLE EAST** *Turkey*: Halpern & Tan 2001 (college); Tan et al. 2003:1352 (college) **NORTH AMERICA** *Canada*: Shephard et al. 1962 (moving targets on a display panel with a joystick); Tapley & Bryden 1977; Voyer & Bryden 1990; Gouchie & Kimura 1991; Watson & Kimura 1991 (viewfinder test); Desrocher et al. 1995; SD Moffat & Hampson 1996b; Collins & Kimura 1997 (college, two-dimensional clock test); Voyer 1997 (college); DM Saucier et al. 2002; Voyer et al. 2004 (college); Voyer & Saunders 2004; Peters 2005 (college); *United States*: Shepard & Metzler 1971; JS Hyde et al. 1975; SG Vandenberg & Kuse 1978; Kail et al. 1979 (young); B Sanders et al. 1982; Horan & Rosser 1984* (3D); Crockett & Peterson 1985; Beatty & Troster 1987 (college); R Block et al. 1989; Bryden et al. 1990; BA Gladue et al. 1990; D Goldstein et al. 1990* (college, with time restraints); Alington et al. 1992; Geary et al. 1992; Alington et al. 1993 (young); Masters & Sanders 1993:339*; Resnick 1993; Uecker & Obrzut 1993; Birenbaum et al. 1994 (young); JT Richardson 1994; Desrocher et al. 1995; BA Gladue & Bailey 1995a; Martino & Winner 1995 (college); M Peters et al. 1995* (3D); Halpern & Wright 1996 (college); Delgado & Prieto 1996; McBurney et al. 1997 (college); McWilliams et al. 1997; Crucian & Berenbaum 1998; Epting & Overman 1998:1310 (college); MS Masters 1998; Nordvik & Amponsah 1998 (college); Sandstrom et al. 1998; Schaeffer & Thomas 1998; Stumpf 1998; Montello et al. 1999 (young); Neave et al. 1999 (young); Scali et al. 2000* (accuracy); Malinowski 2001; Levine & Stern 2002 (college); Siegel-Hinson & McKeever 2002 (college); ID Cherney et al. 2003 (young); GM Alexander & Peterson 2004:413; Devlin 2004 (college) **PRIMATE (EXCEPT APE)** *Baboon*: Vauclair et al. 1993	**NORTH AMERICA** *United States*: B Sanders et al. 1982; Campos & Cofan 1986; ES Johnson & Meade 1987 (6-18 yr olds) **INTERNATIONAL** *Multiple countries*: Silverman & Eals 1992; Voyer et al 1995 (meta-analysis)
No signif. difference						**LATIN AMERICA** *Jamaica*: Persaud 1991 (college) **NORTH AMERICA** *United States*: Horan & Rosser 1984* (2D); Goldstein et al. 1990* (no time restraints); Sharps et al. 1993; M Peters et al. 1995* (2D); Halpern & Wright 1996:18; DJ Wegesin 1998a; JE Roberts & Bell 2000 (young, after extensive practice); Scali et al. 2000* (speed)	
Females more accurate or faster							

5.2.4.13. Mirror Image Reversal Discrimination

In a mirror image reversal tasksubjects are allowed to view an experimental surface only as a mirror image, and are then required to navigate or trace a particular route within this mirror imaged space. The two studies compared the sexes in their skills at performing such tasks among preschoolers and both concluded that boys were significantly better than girls; following puberty, females seem to perform better than males (Table 5.2.4.13).

Table 5.2.4.13. Mirror image reversal discrimination.

Nature of Any Difference	Prepubertal				Postpubertal		
			Early Childhood	Childhood	Adolescent	Adult	
Males better			**NORTH AMERICA** *United States*: Cronin 1967; Rosser et al. 1984	**NORTH AMERICA** *United States*: Clinton 1930*			
No signif. difference							
Females better					**NORTH AMERICA** *United States*: Clinton 1930*	**NORTH AMERICA** *Canada*: Hampson & Kimura 1988 (college); Hampson 1990 (college); *United States*: O'Boyle & Hoff 1987 (college)	

5.2.4.14. Morris Water Maze

The Morris water maze usually consists of a tank of water containing a slightly submerged platform for animals to locate when they no longer want to swim. For human subjects, a computerized virtual Morris water maze test has been developed. In both cases, this type of maze may be thought of as a special type of maze traversing test. Most studies have concluded that males are faster and more accurate in locating these platforms than are females (Table 5.2.4.14).

Table 5.2.4.14. Morris water maze.

Nature of Any Difference	Prepubertal	Postpubertal	
		Adolescent	Adult
Males better			**NORTH AMERICA** *Canada:* RS Astur et al. 1998 (virtual Morris water maze); Moffat et al. 1998 (virtual Morris water maze) **RODENT** *Deer Mouse*: LA Galea et al. 1994* (during breeding season); M Kavaliers et al. 1996 (find hidden platform after exposed to 60Hz magnetic field during training); M Kavaliers et al. 1996 (find hidden platform);Galea et al. 1996; Kavaliers et al. 1996; *Meadow Vole*: M Kavaliers et al 1998b; Galea et al. 1995; Kavaliers et al. 1998; Vinader-Caerols et al. 2002; *Mouse*: Berger-Sweeney et al. 1995; *Rat*: B Kolb & J Cioe 1996* (after medial frontal cortex lesions); Kavaliers et al. 1998; Cimadevilla et al. 1999; Carr et al. 2003; Juraska et al. 1984*; RL Roof & Havens 1992*; RL Roof 1993*; Roof & Stein 1999
No signif. difference	**RODENT** *Rat*: Dixon & DeFries 1968 (5-6 week olds, NMRI strain)	**RODENT** *Rat:* L Kanit et al. 2000 (with visible platform)	**RODENT** *Deer Mouse*: LA Galea et al. 1994* (during nonbreeding season); Kavaliers et al. 1996; *Mouse*: CL Williams & Meck 1991; Roof & Havens 1992*; *Mountain Vole*: Sawrey et al. 1994*; *Prairie Vole*: Sawrey et al. 1994*; *Rat*: DJ Bucci et al. 1995 (6 months old); CF Loidl et al. 2000 (after perinatal asphyxia)
Females better			**RODENT** *Rat*: Bucci et al. 1995 (elderly); B Kolb & J Cioe 1996* (before medial frontal cortex lesions)

5.2.4.15. Paper Folding Test

Paper folding test require human subjects to fold paper in specific ways as shown in modeled drawings. Table 5.2.4.15 indicates that males outperform females in these tests.

Table 5.2.4.15. Paper folding test.

Nature of Any Difference	Prepubertal	Postpubertal	Multiple Age Categories
	Childhood	Adult	
Males better	**OCEANIA** *Australia*: Richmond 1980	**AFRICA** *Ghana*: Amponsah & Krekling 1997:86* (college) **EUROPE** *Norway*: Amponsah & Krekling 1997:86* (college) **NORTH AMERICA** *United States*: Montello et al. 1999 (young)	**MIDDLE EAST** *Israel*: Loehlin et al. 1978
No signif. difference			
Females better			

5.2.4.16. Perceptual Restructuring Other Than the Embedded Figure and Rod and Frame Tests

A few studies involved tasks in which human subjects were required to perceptually restructure some aspect of complex objects other than those involved in the embedded figure and rod and frame tests. In these cases, males performed better than females (Table 5.2.4.16).

Table 5.2.4.16. Perceptual restructuring other than the embedded figure and rod and frame tests.

Nature of Any Difference	Prepubertal	Multiple Age Categories
	Childhood	
Males better	**EUROPE** *Scotland*: MacMeeken 1939	**NORTH AMERICA** *United States*: Porteus 1918; McNemar 1942
No signif. difference		
Females better		

5.2.4.17. Piaget's Water Level Test

In Piaget's water level test, subjects are told to give their best estimate of the level at which water would settle in drawings of pitchers or drinking glasses tipped at various angles. As show in Table 5.2.4.17, nearly all studies have found that males provide more accurate estimates than do females.

Table 5.2.4.17. Piaget's water level test.

Nature of Any Difference	Prepubertal				Postpubertal		Multiple Age Categories
				Childhood	Adolescent	Adult	
Males better				**EUROPE** *Norway*: Vederhus & Krekling 1996 **NORTH AMERICA** *Canada*: Choi & Silverman 2003*	**ASIA** *China*: C Li 2000:493 **NORTH AMERICA** *Canada*: Choi & Silverman 2003*; *United States*: Signorella & Jamison 1978 (young)	**AFRICA** *Ghana*: Amponsah & Krekling 1997:86* (college) **EUROPE** *Britain*: G Sanders & Ross-Field 1986 (college); *Norway*: Amponsah & Krekling 1997:86* (college); Nordvik & Amponsah 1998 (college, technology and social science majors); *Sweden*: Lewin et al. 2001 **NORTH AMERICA** *Canada*: CM McCormick & Felson 1991; Voyer 1996a; *United States*: Rebelsky 1964 (college); BB Morris 1971; H Thomas et al. 1973 (college); Walker & Krasnoff 1978; Meehan & Overton 1986 (college); Signorella et al. 1989; BA Gladue et al. 1990* (college, heterosexuals); M Robert 1990; Vasta et al. 1993 (college); Lawton 1994 (college); M Robert & Ohlmann 1994; BA Gladue & Bailey 1995a; Vasta et al. 1996 (college); Epting & Overman 1998:1310 (college); DJ Wegesin 1998a; Voyer et al. 2000	**NORTH AMERICA** *Canada*: Robert & Harel 1996
No signif. difference						**EUROPE** *Britain*: Neave et al. 1999 **NORTH AMERICA** *United States*: Munsinger 1974 (college); BA Gladue et al. 1990* (college, homosexuals)	
Females better							

5.2.4.18. Radial Arm Maze Navigation

Radial arm mazes involve putting animals in the center of a wheel with several arms (or spokes) radiating out. One of the arms will contain a reward. As shown in Table 5.2.4.18, most studies of nonhuman animals have usually found males to perform better in these mazes than females. The two studies of humans in computerized virtual radial arm mazes failed to find any significant sex difference.

Table 5.2.4.18. Radial arm maze navigation.

Nature of Any Difference						Postpubertal	
						Adult	
Males better						**RODENT** *Meadow Vole*: Gaulin & Fitzgerald 1986 (Tolman sunburst maze); *Mouse*: Mishima et al. 1986; LaBuda et al. 2002; Gresack & Frick 2003; *Rat*: JL Dawson 1972 (Tolman sunburt maze); Einon 1980; Juraska et al. 1984; Mishima et al. 1986; RL Roof & Havens 1992; RL Roof 1993b; P Seymoure et al. 1996; LaBuda et al. 2002 **RODENT** *Rat*: JL Dawson 1972	
No signif. difference						**NORTH AMERICA** *United States*: Astur et al. 1998 (8-arm); LJ Levy et al. 2005 (12-arm) **RODENT** *Rat*: C Williams & Meck 1991	
Females better						**RODENT** *Mouse*: LA Hyde et al. 2000 (non-spatial)	

5.2.4.19. Rod and Frame Perceptual Test Performance (Field Articulation)

The rod and frame test requires subjects to rotate a rod until it is perceived to be perfectly vertical. Making the task difficult is the fact that subjects must perform the task within a visual environment that is tilted. Like Piaget's water level test mentioned above, the rod and frame test is assumed to be measuring people's varying abilities to estimate how physical things are oriented in a 2- or 3-dimensional space. According to Table 5.2.4.19, males are at least slightly better than females in performing the rod and frame task, although several studies (often based on fairly small samples) have failed to reveal a significant difference.

Table 5.2.4.19. Rod and frame perceptual test performance (field articulation).

Nature of Any Difference	Prepubertal				Postpubertal		Multiple Age Categories
				Childhood	Adolescent	Adult	
Males higher				**NORTH AMERICA** *United States*: Witkin 1949; Seder 1957; Carden 1958; Dreyer et al. 1971 (young, field independent); Ramirez & Price-Williams 1974; Ramirez et al. 1974 (young)	**NORTH AMERICA** *United States*: HH Young 1957; Nash 1975; DW Schwartz & Karp 1967*	**ASIA** *Japan*: Kato 1965 (college) **EUROPE** *France*: CM Franks 1956a (young) **NORTH AMERICA** *Canada*: Newbigging 1954 (young); L Tremblay et al. 2004 (college); *United States*: AS Miller 1953 (young); DH Bennett 1956 (young); Bieri et al. 1958 (college); DM Fink 1959 (young); Sarason & Minard 1962 (college); Vaught 1965 (college); Fiebert 1967* (deaf subjects, young); DW Schwartz & Karp 1967*; Bogo et al. 1970 (college); Gerace & Caldwell 1971 (young); Morf et al. 1971 (college); J Silverman et al. 1973 (college); Sholl 1989; Epting & Overman 1998:1310 (college)	**AFRICA** *Nigeria*: Okonji 1969* (rural) **EUROPE** *France*: Andrieux 1955; Chateau 1959 **LATIN AMERICA** *Mexico*: Witkin et al. 1974* (ages 9-15) **NORTH AMERICA** *United States*: Witkin 1949
No signif. difference				**EUROPE** *Norway*: Vigeland 1973 **NORTH AMERICA** *United States*: S Kagan 1974	**AFRICA** *Zambia*: Siann 1972 **NORTH AMERICA** *United States*: Fiebert 1967* (deaf subjects); Weinberg & Rabinowitz 1970	**EUROPE** *Netherlands*: Wit 1955 (college) **NORTH AMERICA** *Canada*: Robert & Tanguay 1990 *United States*: Bieri 1960 (college); Goldstein & Chance 1965 (college); DW Schwartz & Karp 1967*; Willoughby 1967 (college); Oltman 1968 (college); Morf & Howitt 1970 (college); Blum et al. 1972	**AFRICA** *Nigeria*: Okonji 1969* (urban) **EUROPE** *Italy*: Witkin et al. 1974* (ages 9-15)
Females higher							

5.2.4.20. Route-Learning (Map Reading, Direction-Finding, Route-Finding)

Several studies have sought to determine which gender learns routes to various locations more quickly and with fewest errors. Most studies have concluded that males perform these tasks better than do females (Table 5.2.4.20).

Table 5.2.4.20. Route-learning (map reading, direction-finding, route-finding).

Nature of Any Difference	Prepubertal				Postpubertal		Multiple Age Categories
				Childhood	Adolescent	Adult	
Males faster &/or faster with fewer errors				**NORTH AMERICA** *United States*: FE Lord 1941 (older); HW Stevenson et al. 1990; Gibbs & Wilson 1999	**ASIA** *China*: K Chang & Antes 1987* **NORTH AMERICA** *United States*: K Chang & Antes 1987*	**EUROPE** *Germany*: Schmitz 1999 (recall of route directions, speed in way-finding) **NORTH AMERICA** *Canada*: Foley & Cohen 1984 (college); Galea & Kimura 1993:53 (college, used visual memory as a co-variate); Moffat et al. 1998 (spatial route learning, maze); Silverman et al. 2000; *United States*: Kozlowski & Bryant 1977 (college); LJ Harris 1981 (college); KJ Bryant 1982 (young); McGuiness & Sparks 1983 (college); Lunneborg 1984 (college); SL Ward et al. 1986 (college); CS Holding & Holding 1989 (college); Beatty & Duncan 1990 (college, pathfinding test); BA Gladue et al. 1990 (Fargo map test); CA Lawton 1994 (college); Devlin & Bernstein 1995 (college); CA Lawton 1996; S Schmitz 1997; SD Moffat et al. 1998 (unfamiliar sites); Sandstrom et al. 1998 (computerized navigation); Sholl et al. 2000:20 (young); Malinowski & Gillespie 2001; Waller et al. 2001 (map representation); Saucier et al. 2002 (physical navigation); Zinser et al. 2004 (college) **OCEANIA** *Australia*: Cutmore et al. 2000 (use of navigational cues in virtual environment, learn mazes faster); Zinser et al. 2004 (college) **RODENT** *Meadow Vole*: DM Madison & McGhea 1987* (during mating season)	**RODENT** *Rat*: Williams et al. 1990 (use more geometric cues in maze)
No signif. difference						**EUROPE** *Britain*: Rahman et al. 2005 (Money's Standarized Road Map Test of Direction Sense, MRMT) **NORTH AMERICA** *United States*: Beatty & Bruellman 1987 (young, learned locations on an unfamiliar map); Beatty & Troster 1987* (young, learned locations on an unfamiliar map); Sadalla & Montello 1989	
Females faster						**RODENT** *Meadow Vole*: DM Madison & McShea 1987* (not during breeding season)	

5.2.4.21. Solving Holusions

Holusions (also called autostereograms) consist of hundreds of seemingly random computer-generated dots and splotches within which 3-dimentional images are embedded. By allowing one's eyes to go out of focus while staring at the dots and splotches, many people can clearly see the images. Available research indicates that males are more likely than females to visualize the embedded images (Table 5.2.4.21).

Table 5.2.4.21. Solving holusions.

Nature of Any Difference					Postpubertal	Multiple Age Categories
					Adult	
Males better					**NORTH AMERICA** *United States*: L Ellis & Blanton 1995 (college)	**NORTH AMERICA** *United States*: Pratarelli & Steitz 1995
No signif. difference						
Females better						

5.2.4.22. Use of Landmarks to Traverse Geographic Space

Given gender differences in way-finding ability, numerous studies have sought to determine if males and females use different strategies to traverse geographic space. Table 5.2.4.22 shows that there are differences, with females relying on familiar landmarks for navigation more than males. The strategy that males appear to use more has been termed "kinesic memory", "dead reckoning", or a vector strategy (Roberts & Pennebaker 1995:157). Males also seem to rely more on physical features rather than on landmarks when compared to females (as discussed in a subsequent table).

Interestingly, this gender difference in the use of landmarks has even been revealed in a few studies of rats. Specifically, female rats were more likely than male rats to lose their way in a familiar maze whenever researchers repositioned some of the maze's key landmarks.

Table 5.2.4.22. Use of landmarks to traverse geographic space.

Nature of Any Dif-ference	Prepubertal				Postpubertal		Multiple Age Categories
				Childhood	Adolescent	Adult	
Males more				**NORTH AMERICA** *United States*: Gibbs & Wilson 1999			
No signif. difference						**EUROPE** *Britain*: Rahman et al. 2005 (map task)	
Females more				**EUROPE** *Germany*: Neidhardt & Schmitz 2001 (young, 3D mazes)	**RODENT** *Rat*: CL Williams et al. 1990	**NORTH AMERICA** *Canada*: Galea & Kimura 1993* (college, used visual memory as a co variate); Choi & Silverman 1996*; Moffat et al. 1998; Choi & Silverman 2002:118* (college); *United States*: McGuiness & Sparks 1983; LK Miller & Santoni 1986; SL Ward et al. 1986; Bever 1992; Lawton 1994; Astur et al. 1998; Dabbs et al. 1998; Sandstrom et al. 1998; Maguire et al. 1999; Saucier et al. 2002 **RODENT** *Rat*: Williams et al. 1990 (in a maze); CL Williams & Meck 1991 (in a maze)	**NORTH AMERICA** *Canada*: Galea & Kimura 1993*; *United States*: LK Miller & Santoni 1986; Montello et al. 1999 **RODENT** *Rat*: Roof & Stein 1999 (in the Morris water maze)

5.2.4.23. Traversing 2-D Space Using Visual Cues Other Than Landmarks

Visual cues other than landmarks include contour features and actual distances between points in a route. Numerous studies have shown that males are more likely than females to use such visual cues when traversing two-dimensional space (Table 5.2.4.23).

Table 5.2.4.23. Traversing 2-D space using visual cues other than landmarks.

Nature of Any Dif-ference	Prepubertal				Postpubertal		Multiple Age Categories
				Childhood	Adolescent	Adult	
Males better				**NORTH AMERICA** *United States*: Lindgren & Benton 1980*	**EUROPE** *Britain*: CJ Hamilton 1995* **NORTH AMERICA** *United States*: FE Lord 1941 (young); Glennon & Callahan 1968; Lindgren & Benton 1980*; AL Benton et al. 1983*; DW Desmond et al. 1994*	**EUROPE** *Britain*: CJ Hamilton 1995* **NORTH AMERICA** *Canada*: I Silverman et al. 2000 (college); *United States*: KJ Bryant 1982 (college); AL Benton et al. 1983* (college); SL Ward et al. 1986 (college, cardinal & mileage directions from a map); CS Holding & Holding 1989; CS Holding 1992 (young); DW Desmond et al. 1994*; Gladue & Bailey 1995a (college); Glamser & Turner 1995; Lawton 1996 (young); Lawton et al. 1996 (college); Collaer & Nelson 2002 (young, judgment of the orientation)	**NORTH AMERICA** *United States*: Presson et al. 1989
No signif. difference						**NORTH AMERICA** *United States*: JL Pearson & Ferguson 1989 (young)	
Females better							

5.2.4.24. Using Linguistic Instructions to Traverse Geographic Space

A common joke at least in North American culture has to do with males who are lost never bothering to ask others for directions. Table 5.2.4.24 cites one study that provides empirical support for this generalization in the sense that females were more likely than males to rely on linguistic information to move about in two-dimensional space.

Table 5.2.4.24. Use of linguistic instructions to traverse geographic space.

Nature of Any Difference	Postpubertal
	Adult
Males do so more	
No signif. difference	
Females do so more	**NORTH AMERICA** *United States*: CA Lawton 1994

5.3
KNOWLEDGE

As the term is being used here, academic test scores are those received on objective tests that are not part of any particular course being taken. The most common example of academic test scores are those used in selective college admissions.

5.3.1. Knowledge of Assorted Types and Topics

Many studies have been undertaken to determine which sex has greater knowledge in various subject areas. The results are summarized below.

5.3.1.1. Knowledge in General

Tests of knowledge in general can never be comprehensive. With this caveat in mind, it is still noteworthy that males usually score higher than females on attempts to measure overall knowledge. An explanation of this pattern of findings may lie in the greater interest and knowledge males seem to have in national and international world affairs, topics that may weigh heavily in most tests of people's wide ranging knowledge (Table 5.3.1.1).

Table 5.3.1.1. Knowledge in general.

Nature of Any Difference	Prepubertal		Postpubertal		Multiple Age Categories
	Early Childhood	Childhood	Adolescent	Adult	
Males higher	**NORTH AMERICA** *United States*: Hall 1891	**EUROPE** *Scotland*: Anonymous 1949 **NORTH AMERICA** *United States*: Libby & Cowles 1910*; Terman 1916*; Van Wagenen 1925; Pressey & Pressey 1921; Book & Meadows 1928; Terman & Merrill 1937; Seashore et al. 1950	**EUROPE** *Estonia*: Allik et al. 1999; *Germany*: Lynn et al. 2004 **NORTH AMERICA** *United States*: Libby & Cowles 1910*; Terman 1916*; Whipple 1927b; Book & Meadows 1928; Scanlon 1973; AS Kaufman et al. 1988; Rolfhus & Ackerman 1999 **INTERNATIONAL** *Multiple Countries*: Wilberg & Lynn 1999	**EUROPE** *Britain*: R Lynn et al. 2002 (college); R Lynn & Irwing 2002 (college); *Germany*: R Lynn et al. 2004; *Netherlands*: Born & Lynn 1994; *Northern Ireland*: Lynn et al. 2002:32 (college); R Lynn & Irwing 2002; *Scotland*: R Lynn & Mulhern 1991 **NORTH AMERICA** *United States*: King & M'Crory 1918; Paterson & Langlie 1926; Wechsler 1958; AR Jensen & Reynolds 1983	**EUROPE** *Ireland*: Irwing et al. 2001; Lynn & Irwing 2002; Lynn et al. 2002 **NORTH AMERICA** *United States*: Conrad et al. 1933
No signif. difference		**EUROPE** *Scotland*: MacMeeken 1939	**EUROPE** *Britain*: JA Roberts et al. 1935; *Germany*: Franken 1912* **NORTH AMERICA** *United States*: R Pintner 1924		
Females higher		**EUROPE** *Germany*: Franken 1912*			

5.3.1.2. Erroneous Knowledge

One study reported no significant sex difference with regard to the degree to which college students were aware of inaccurate information concerning factors associated with suicide (Table 5.3.1.2).

Table 5.3.1.2. Erroneous knowledge.

Nature of Any Difference					Postpubertal	
						Adult
Males have more						
No signif. difference						**EUROPE** *New Zealand*: AL Beautrais et al. 2004 (young, pertaining to suicide)
Females have more						

5.3.1.3. Knowledge of Health Problems in One's Family

A few studies have found that women are more likely than men to be aware of health problems among family members (Table 5.3.1.3).

Table 5.3.1.3. Knowledge of health problems in one's family.

Nature of Any Difference					Postpubertal	
						Adult
Males have more						
No signif. difference						
Females have more						**NORTH AMERICA** *United States*: Aitken et al. 1995 (family's health history); Kerber & Slattery 1997 (family's health history); Koutantji et al. 1998 (young, family's problems with pain) **OCEANIA** *Australia*: Wilhelm et al. 2002:48 (among persons with depression more females recall mental illness in their family)

5.3.1.4. Knowledge of Obscene Words

The available research indicates that males are more likely to know the meaning of words that are considered obscene (Table 5.3.1.4).

Table 5.3.1.4. Knowledge of obscene words.

Nature of Any Difference					Postpubertal	
						Adult
Males have more						**NORTH AMERICA** *United States*: R Foote & Woodward 1973 (college); Kutner & Brogan 1974 (college); W Wilson 1975 (college)
No signif. difference						
Females have more						

5.3.1.5. Knowledge of Sports

According to the one available study, men exhibited greater overall knowledge of sports than did women (Table 5.3.1.5).

Table 5.3.1.5. Knowledge of sports.

Nature of Any Difference					Postpubertal	
						Adult
Males have more						**EUROPE** *Germany*: R Lynn et al. 2004
No signif. difference						
Females have more						

5.3.1.6. Financial Knowledge

One study concluded that males were more knowledgeable of financial matters than were females (Table 5.3.1.6).

Table 5.3.1.6. Financial knowledge.

Nature of Any Difference					Postpubertal	
						Adult
Males have more						**EUROPE** *Germany*: R Lynn et al. 2004
No signif. difference						
Females have more						

5.3.1.7. Source of Knowledge About Sex

One study compared the sexes regarding their main sources for knowledge about sex. It concluded that whereas males got most of their information from same-sex peers, females got their greatest amount from television and magazines (Table 5.3.1.7).

Table 5.3.1.7. Source of knowledge about sex.

Nature of Any Difference	Postpubertal
	Adolescent
Males have more	**ASIA** *India*: Grover et al. 2003:23* (talking to male peers)
No signif. difference	
Females have more	**ASIA** *India*: Grover et al. 2003:23* (magazines and television)

5.3.2. Health/Medical Science Knowledge

The possibility that males and females have different levels of knowledge in matters of health and medicine has been investigated by several studies. The findings are reviewed in the following two tables.

5.3.2.1. Health Knowledge in General

Research surrounding which gender knows most about health and nutrition has shown females surpassing males (Table 5.3.2.1).

Table 5.3.2.1. Health knowledge in general.

Nature of Any Difference	Postpubertal		Multiple Age Categories
	Adolescent	Adult	
Males have more			
No signif. difference		**EUROPE** *Germany*: R Lynn et al. 2004* (medicine)	
Females have more	**NORTH AMERICA** *United* States: JK Robinson et al. 1996 (more knowledge of skin cancer risks); JK Robinson et al. 1997 (more knowledge of skin cancer risks)	**EUROPE** *Germany*: R Lynn et al. 2004* (nutrition); *Northern Ireland*: Lynn et al. 2002:32 (college) **NORTH AMERICA** *United States*: BWK Yee et al. 2003 (Vietnamese, chronic disease)	**EUROPE** *Britain*: Coope & Metcalfe 1979; AH Baker & Wardle 2003 (nutrition) **NORTH AMERICA** *United States*: Tate & Cade 1990 (nutrition) **OCEANIA** *Australia*: DA Crawford & Baghurst 1990 (nutrition)

5.3.2.2. AIDS Knowledge

A number of studies have tested adolescents and young adults concerning the extent and accuracy of their knowledge of AIDS. Most of these studies have concluded that males and females have roughly equivalent knowledge of this topic (Table 5.3.2.2). Studies that have suggested a significant gender difference exist generally suggest that females have greater knowledge, at least by young adulthood.

Table 5.3.2.2. AIDS knowledge.

Nature of Any Difference	Postpubertal	
	Adolescent	Adult
Males more	**ASIA** *India*: Grover et al. 2003:24 (early adolescent)	**ASIA** *China*: Li et al. 2004:351 (college) **MIDDLE EAST** *Kuwait*: Al-Owaish et al. 1999
No signif. difference		**NORTH AMERICA** *Canada*: Svenson & Varnhagen 1990 (young); *United States*: McDermott et al. 1987 (young); F Rhodes & Wolitski 1989 (young); I Crawford 1990; L Carroll 1991 (young); Negy & Weber 1991 (young); Goh 1993 (young); S McCormack et al. 1993 (young); RK Young et al. 1993 (young)
Females more		**NORTH AMERICA** *United States*: Goodwin & Roscoe 1988 (young); Gamba 1990 (young); Fielstein et al. 1992; E Johnson et al. 1992 (Blacks)

5.3.3. Math Knowledge/Reasoning

Sex differences in knowledge and reasoning ability having to do with mathematics and arithmetic are presented in the next series of tables. While the terms *mathematics* and *arithmetic* are sometimes used interchangeably (including by the researchers whose findings are summarized below), as a general rule, mathematical subject matter is more complex. In other words, whereas arithmetic typically involves properly performing basic addition, subtraction, multiplication, and division, mathematics usually encompasses the disciplines of algebra, trigonometry, and calculus.

5.3.3.1a. Mathematics Knowledge/Reasoning Skills in General (Prepubertals)

So voluminous is the research on gender differences of general knowledge in mathematics that the relevant table is presented in two parts, the first of which pertains to prepubertal human subjects (Split-Table 5.3.3.1a). This portion of the table presents a mixed picture with respect to any difference, with about as many studies suggesting that there are no significant gender differences or that females exhibit higher skills as there are studies indicating that males surpass females. Overall, this portion of the table is somewhat inconsistent with a meta-analysis by Hyde et al. (1990) who asserted that females perform better than males in mathematical ability tests among primary school students.

Split-Table 5.3.3.1a. Mathematics knowledge/reasoning skills in general (prepubertals).

Nature of Any Difference	Prepubertal			
				Childhood
Males have more				**EUROPE** *Britain*: Wood 1976* (problem solving, interpreting graphs, coping with proportions); G Driver 1980*; *Germany*: Klieme et al. 2001; *Scotland*: Willms & Kerr 1987* **MIDDLE EAST** *Kuwait*: Al Methen & Wilkinson 1988 **NORTH AMERICA** *Canada*: Randhawa 1991*; *United States*: JD Heilman 1933 (older); McNemar 1942:50-53; Hilton & Berglund 1974 (age 10); LR McKay 1979* (age 10); Benbow & Stanley 1983b*; Fennema & Tartre 1985 (word problems and fractions); P Peterson & Fennema 1985; SP Marshall & Smith 1987 (word problems); Benbow 1992:57; LV Hedges & Norwell 1995; DC Geary 1996; NM Robinson et al. 1996; Reese et al. 1997* (in 4th grade) **OCEANIA** *Australia*: Annice et al. 1988; MacCann 1995:181 **INTERNATIONAL** *Industrial Countries*: Raphael et al. 1984; *Multiple Countries*: Hyde et al. 1990 (meta-analysis); Lummis & Stevenson 1990 (word problems); Randhawa 1994
No signif. difference				**EUROPE** *Britain*: Foxman et al. 1980a; *France*: Rouxel 2000; *Scotland*: Willms & Kerr 1987* (1984) **NORTH AMERICA** *United States*: McKay 1979 (before grade 4); Callahan & Clements 1984 (before grade 4); Eccles 1984:115* (objective test); Lewis & Hoover 1987; Randhawa & Hunt 1987 (before grade 4); Dossey et al. 1988 (before grade 4); Mullis et al. 1990*; Boldizar 1991*; Reese et al. 1997* (in 1st grade) **OCEANIA** *Australia*: Leder 1982; JD Moss 1982; *New Zealand*: DM Fergusson & Horwood 1997:87 (older) **INTERNATIONAL** *Multiple Countries*: X Ma 1995
Females have more				**EUROPE** *Britain*: Wood 1976* (Venn diagrams, sets, real number line graphs, vectors, functions, matrix multiplication) **LATIN AMERICA** *West Indies*: G Driver 1980* **NORTH AMERICA** *United States*: Marshall & Smith 1987

5.3.3.1b. Mathematics Knowledge/Reasoning Skills in General (Postpubertals)

In the case of adolescents and adults, the picture is much more consistent with respect to gender differences in mathematics knowledge. Only a proverbial handful of studies have failed to find males performing significantly better than females. Gender differences seem to be the greatest in the case of the most complex test items where rote-memory is least involved in deriving correct answers (Split-Table 5.3.2.1b). Overall, the evidence contained in the tables on mathematical ability casts some doubt upon the assertion that sex differences in such ability are "small or nonexistent" (Oliver & Hyde 2001:29).

Split-Table 5.3.3.1b. Mathematical knowledge and reasoning skills in general (postpubertals).

Nature of Any Difference	Postpubertal		Multiple Age Categories
	Adolescent	Adult	
Males have more	**AFRICA** *South Africa*: Cherian 1993* (upper and middle social strata) **ASIA** *Thailand*: Englehard 1990* **EUROPE** *Britain*: R Wood 1976; Cornelius & Cockburn 1978; R Murphy 1978; Foxman et al. 1980b; Sharma & Rolan 1980; Foxman et al. 1985; Shuard 1986; R Lynn 1992* (aptitude tests); M Arnot et al. 1998; *Germany*: O Koller et al. 2000; Kirkcaldy et al. 2003:54 (self-rated); *Ireland*: Bolger & Kellaghan 1990; *Norway*: Undheim & Nordvik 1992; *Switzerland*: Beerman et al. 1992 **MIDDLE EAST** *Israel*: Lewy & Chalfon 1973; Dar 1974 **NORTH AMERICA** *Canada*: Randhawa & Hunt 1987; Randhawa 1988; Randhawa 1991*; Voyer 1996a (lab); *United States*: Fishman 1957 (SAT-M); KP Cross 1971 (SAT-M, ACT-M); Maccoby & Jacklin 1974; R Wood 1976; Backman 1979:263 (high school seniors); LR McKay 1979*; JA Sherman 1979; Benbow & Stanley 1980 (SAT-M); Dept. of Education & Science 1980; JA Sherman 1980; Swafford 1980; Fennema & Carpenter 1981; LH Fox 1981 (young, problem solving with math); Benbow & Stanley 1983b* (SAT-M); Carpenter et al. 1983; Pallas & Alexander 1983 (SAT-M); LV Jones et al. 1984 (Blacks); Fennema & Tate 1985; JA Jacobs & Eccles 1985; BM Byrne & Shavelson 1986; Ramist & Arbeiter 1986 (college bound); Raymond & Benbow 1986 (SAT-M); Monaco & Gentile 1987; DM Tracy 1987; Doolittle & Cleary 1987 (higher math); Benbow 1988b; A Feingold 1988 (high school, PSAT, SAT-M); NW Burton et al. 1988 (SAT-M); JA Dossey et al. 1988; Smith & Walker 1988* (10th grade); Bradberry 1989*; National Council of Teachers of Mathematics 1989; BJ Becker 1990 (SAT-M); Englehard 1990*; JS Hyde et al. 1990; Mullis et al. 1990*; AJ Reynolds 1991 (young); R Lynn 1992* (aptitude tests); AM Harris & Carlton 1993 (SAT-M); CJ Mills et al. 1993; JC Stanley 1993; AM Gallagher & De Lisi 1994 (SAT-M); S Hanson 1994 (advanced classes); LV Hedges & Nowell 1995; Beller & Gafni 1996*; Stumpf & Stanley 1996; US Department of Education 1996; MB Casey et al. 1997; Bielinski & Davidson 1998 (higher math); JR Campbell & Beaudry 1998; DeMars 1998; Manger & Eikeland 1998; Royer et al. 1999 (higher math); JW Osborne 2001; Bielinski & Davison 2001 (especially more difficult questions); Wigfield & Eccles 2002; Freeman 2004 **OCEANIA** *Australia*: LH Parker 1984; LH Parker 1992; *New Zealand*: SD Forbes 1987; New Zealand Council for Education Research 1988 **INTERNATIONAL** *Multiple Countries*: Harnisch et al. 1986; Lapointe et al. 1989; Hanna et al. 1990; DP Baker & Jones 1993; Beller & Gafni 1996 *; EM Evans et al. 2002:158; Penner 2003:652	**AFRICA** *Several African Countries*: Cherian & Siweya 1996 (college, tests among math majors) **MIDDLE EAST** *Israel*: Zeidner 1986 (college) **NORTH AMERICA** *United States*: Gilliland & Clark 1939 (young); GA Milton 1957 (problem solving); S Gross 1988 (student evaluations of teachers); RT Osborne & Sanders 1954 (GRE-M); BG Rosenberg & Sutton-Smith 1964 (college); Dye & Very 1968; Educational Testing Service 1972 (GRE-M); Notman & Nadelson 1973 (young); JS Hyde et al. 1975*; Vidal-Modjar 1978 (college, psychology majors); Armstrong 1980* (young); Benbow & Stanley 1982 (SAT-M); Pallas & Alexander 1983 (college, after controlling for number of math courses taken); JV Andrews 1985; Doolittle & Cleary 1987 (college); Bradberry 1989* (young); Pearson & Ferguson 1989 (ACT); G Hackett et al. 1990 (college); Hyde et al. 1990 (generalization); Bridgeman & Wendler 1991 (college, number of math courses taken statistically controlled); Ramist et al. 1994 (SAT-M); Stumpf & Stanley 1996 (college, advanced classes); PJ Taylor et al. 1996 (tests); Willingham & Cole 1997 (Math portion of GRE); AM Gallagher et al. 2000 (GRE-Q); DC Geary et el. 2000 (college); Lubinski et al. 2001 (college) **INTERNATIONAL** *Multiple Countries*: Keeves 1973 (young)	**EUROPE** *Britain*: Manger & Eikeland 1998* (complex problems) **NORTH AMERICA** *United States*: Lanouette 1975; K Wilson & Boldizar 1990; Kaufman et al. 1995
No signif. difference	**EUROPE** *Britain*: J Bradley 1981; *Multiple European Countries*: Werdelin 1958; Werdelin 1961 **NORTH AMERICA** *United States*: Herzberg & Lapkin 1954; Cicirelli 1967 (junior high); J Sherman 1979:387; Armstrong 1980*; Connor & Serbin 1985 (junior high); Hearne et al. 1986/1987 (SAT-M); Smith & Walker 1988* (9th & 11th grades); Boldizar 1991*; Bronholt et al. 1994 **OCEANIA** *Australia*: Watt & Bornholt 2000	**AFRICA** *Nigeria:* Arigbadu & Mji 2004 (young teacher math scores); *South Africa*: Cherian & Siweya 1996 (college) **NORTH AMERICA** *Canada*: McKelvie & Rohrberg 1978 (college); *United States*: JS Hyde et al. 1975* (after controlling for spatial reasoning); Eccles 1984:98	**EUROPE** *Britain*: Manger & Eikeland 1998* (simple problems)
Females have more	**AFRICA** *South Africa*: Cherian 1993* (lower social strata) **EUROPE** *Britain*: Tanner & Trown 1979 (British born Asians) **MIDDLE EAST** *United Arab Emirates*: Alkhateeb 2001 **NORTH AMERICA** *Canada*: Voyer 1996a; Gierl et al. 2003:296 (math tasks requiring memorization)		

5.3.3.2. Algebra and Calculus Knowledge/Reasoning Skills

About half of the studies of gender differences in knowledge of algebra and calculus have concluded that males surpass females. Most of the remaining studies suggest there is no significant gender difference (Table 5.3.3.2).

Table 5.3.3.2. Algebra and calculus knowledge/reasoning skills.

Nature of Any Difference	Postpubertal	
	Adolescent	Adult
Males have more	**EUROPE** *Netherlands*: Klinkenberg 1913 **NORTH AMERICA** *United States*: ES Carter 1952; R Low & Over 1993* (worded algebra problems); Stumpf & Stanley 1996 (calculus); Manger & Gjestad 1997 **OCEANIA** *Australia*: R Low & Over 1993* (worded algebra problems)	**AFRICA** *South Africa*: Mwamwenda 2002
No signif. difference	**AFRICA** *South Africa*: Nyangeni & Glencross 1997*; AS Grewal 1998 (Blacks) **NORTH AMERICA** *Canada*: Nyangeni & Glencross 1997*; *United States*: Stroud & Lindquist 1942* (older); NP Nyangen & Glencross 1997 **INTERNATIONAL** *Multiple Countries*: Ma 1995* (China & Japan); Beller & Gafri 1996	**NORTH AMERICA** *United States*: Thorndike 1923 (young) **INTERNATIONAL** *Multiple Countries*: Ma 1995* (China & Japan, young)
Females have more	**NORTH AMERICA** *United States*: Stroud & Lindquist 1942* (young)	**NORTH AMERICA** *United States*: Pease 1930 (young)

5.3.3.3. Arithmetic Knowledge/Reasoning Skills

Table 5.3.3.3a shows that a large number of studies have compared the sexes with respect to their arithmetic knowledge or reasoning skills, and the results have provided a very mixed picture. Basically, while significant gender differences have usually been found, they have been almost evenly divided in terms of suggesting that males or females achieve higher scores prior to puberty.

Split-Table 5.3.3.3a. Arithmetic knowledge/reasoning skills.

Nature of Any Difference	Prepubertal	
	Early Childhood	Childhood
Males have more		**LATIN AMERICA** *Peru*: HW Stevenson et al. 1990 **MIDDLE EAST** *Israel*: Hativa & Shorer 1989 **NORTH AMERICA** *United States*: Courtis 1911*; Burt & Moore 1912; Phillips 1913; Pressey & Pressey 1921; Terman 1925 (gifted); Van Wagenen 1925; Commins 1928; Conrad et al. 1933*; Heilman 1933* (reasoning); B Schiller 1934; Grossnickle 1937; Ferrell 1949; Aiken 1973
No signif. difference	**NORTH AMERICA** *United States*: Woody 1931	**ASIA** *China*: Ai 1945 **NORTH AMERICA** *United States*: Woody 1931; Stroud & Lindquist 1942*; Schaie & Roberts 1971:6 **OCEANIA** *Australia*: KS Cunningham & Price 1935 **INTERNATIONAL** *Multiple Countries*: Lummis & Stevenson 1990
Females have more	**NORTH AMERICA** *United States*: Buckingham & MacLatchey 1930 (counting & number identification)	**EUROPE** *Britain*: M Ward 1979 **NORTH AMERICA** *United States*: Courtis 1911*; Phillips 1913; Gates 1916b; Terman 1925; Van Wagenen 1925; Heilman 1933* (computation); Ferrell 1949; VE Alexander 1962; Wozencraft 1963; Hashway 1981; S Marshall & Smith 1987* (basic computations) **OCEANIA** *New Zealand*: DM Fergusson & Horwood 1997:87* (teacher rated) **INTERNATIONAL** *Multiple Countries*: Engelhard 1990 (US & Thailand)

Beyond puberty, the proportion of studies of a sex difference in arithmetic knowledge and reasoning skills shifts increasingly toward males, especially in adulthood (Table 5.3.3.3b). This latter point may reflect the tendency for the tests of arithmetic knowledge for adults to focus on more complex and less rote-memory aspects of number manipulation than is true for the tests used primarily with children.

Table 5.3.3.3b. Arithmetic knowledge/reasoning skills.

Nature of Any Difference	Postpubertal		Multiple Age Categories
	Adolescent	Adult	
Males have more	**AFRICA** *South Africa*: Cherian 1993* (upper & middle SES background) **ASIA** *China*: Lummis & Stevenson 1990*; *Japan*: Lummis & Stevenson 1990* **NORTH AMERICA** *United States*: Courtis 1911*; Phillips 1913; Terman 1917; Whipple 1927b; Book & Meadows 1928; Stroud & Lindquist 1942*; T Hilton & Berglund 1974; Ethington & Wolfe 1984; SP Marshall & Smith 1987*; Lummis & Stevenson 1990*; JR Campbell 1991; LG Humphreys et al. 1993; Hedges & Nowell 1995 **INTERNATIONAL** *Multiple Countries*: Steinkamp et al. 1985:265; Harnisch et al. 1986 (Western countries)	**LATIN AMERICA** *Dominican Republic*: Imperato-McGinley et al. 1991 **NORTH AMERICA** *United States*: King & M'Crory 1918 (young); Boynton 1926 (young); Crawford 1926 (young); Paterson & Langlie 1926 (young); Pease 1930 (young); Conrad et al. 1933*; Canady 1943 (young); RD Norman 1953 (college); Dye & Very 1968*; Geary et al. 2000* (young, ETS simple and complex subtraction) **OCEANIA** *Australia*: Liddicoat 1961 (WAIS test)	**NORTH AMERICA** *Canada*: TJB Kline 2004; *United States*: Conrad et al. 1933 **INTERNATIONAL** *Multiple Countries*: Loehlin et al. 1978
No signif. difference	**NORTH AMERICA** *Canada*: Hakstian & Cattell 1975:303; *United States*: Havighurst & Breese 1947; Hobson 1947; Herzberg & Lapkin 1954; JC McGuire 1954 (young); Dye & Very 1968* (other groups); Hitchcock & Pinder 1974:7; Entwisle & Baker 1983 (young)	**NORTH AMERICA** *United States*: Kianian 1996 (college); Geary et al. 2000* (young, ETS addition test)	**NORTH AMERICA** *United States*: Miele 1958
Females have more	**AFRICA** *South Africa*: Cherian 1993* (lower SES) **ASIA** *Thailand*: Engelhard 1990* **NORTH AMERICA** *United States*: Courtis 1911*; Fox & Thorndike 1911; Phillips 1913; WJ Meyer & Bending 1961; Dye & Very 1968* (9th grade); LH Fox 1981 (young); Fennema & Meyer 1986 (young); Doolittle & Cleary 1987; AR Jensen 1988; Engelhard 1990* **OCEANIA** *New Zealand*: DM Fergusson & Horwood 1997:87* (young, teacher rated)	**NORTH AMERICA** *United States*: Haggerty & Kempf 1913 (young); WW Clark 1959 (young)	

5.3.3.4. Geometry (or Spatial) Knowledge/Reasoning Skills

Gender differences in knowledge and reasoning ability pertaining to the field of geometry have been assessed in several studies. In most cases, males have been found to surpass females in these skills (Table 5.3.3.4).

Table 5.3.3.4. Geometry (or spatial) knowledge/reasoning skills.

Nature of Any Difference	Prepubertal	Postpubertal
	Childhood	Adolescent
Males have more	**NORTH AMERICA** *United States*: Mulhall 1917	**AFRICA** *South Africa*: Nyangeni & Gleneross 1997 **ASIA** *China*: Ma 1995*; *Japan*: Ma 1995* **EUROPE** *Netherlands*: Klinkenberg 1913 **NORTH AMERICA** *Canada*: Ma 1995*; *United States*: Stockard & Bell 1916; Touton 1924; Webb 1927; Stroud & Lindquist 1942; O'Neill & McPeek 1993 (standardized tests); Montello et al. 1999 (young; newly acquired spatial ability)
No signif. difference		**NORTH AMERICA** *United States*: Senk & Usiskin 1983
Females have more		**NORTH AMERICA** *United States*: Perry 1929

5.3.4. Science Knowledge

Knowledge in the areas of science is generally thought of as primarily covering the topics of physics, astronomy, geology, chemistry, and biology. Research evidence of sex differences in such knowledge in presented in the following tables.

5.3.4.1. Science Knowledge in General

Most studies of science knowledge have indicated that males exhibit more knowledge than do females, although quite a few exceptions have been found, especially prior to adulthood (Table 5.3.4.1).

Table 5.3.4.1. Science knowledge in general.

Nature of Any Difference	Prepubertal				Postpubertal		Multiple Age Categories
				Childhood	Adolescent	Adult	
Males have more				**EUROPE** *Britain*: J Harding 1977; J Harding 1980; J Harding 1981 **NORTH AMERICA** *United States*: Commins 1928; JD Heilman 1933 (tests); Ferrell 1949 **INTERNATIONAL** *Multiple Countries*: Postlethwaite & Wiley 1991* (23 countries)	**AFRICA** *Nigeria*: Adigwe 1992 **ASIA** *Japan*: EM Evans et al. 2002:158*; *Taiwan*: EM Evans et al. 2002:158* **EUROPE** *Britain*: R Murphy 1978; T Harvey 1979; Finn 1980 (physics & chemistry); J Harding 1983; *Scotland*: Croxford 1994; *Sweden*: Engstrom & Noonan 1990 **NORTH AMERICA** *United States*: Stroud & Lindquist 1942; Kostick 1954; J Harding 1981 (objective tests)*; Benbow 1992:57; Bruschi & Anderson 1994; S Hanson 1994 (advanced classes); Catsambis 1995 (young); VE Lee & Burkam 1996 (young); Stumpf & Stanley 1996*; US Department of Education 1996; Barker 1997; DeMars 1998; EM Evans et al. 2002:158* **OCEANIA** *Australia*: DJ Young & Fraser 1993; Walding et al. 1994; *New Zealand*: New Zealand Council for Education Research 1988; *Papua New Guinea*: Waldrip 1994 **INTERNATIONAL** *Multiple Countries*: Keeves 1973:56 (Several Western Countries); Kelley 1981 (19 out of 19 countries); Lapointe et al. 1989; Postlethwaite & Wiley 1991 (23 out of 23 countries); Kotte 1992; Postlethwaite & Wiley 1992; Beller & Gafni 1996 (7 out of 7 countries, young); G Vogel 1996* (14 out of 20 countries); Penner 2003:652	**EUROPE** *Northern Ireland*: Lynn et al. 2002:32 (college) **NORTH AMERICA** *Canada*: G Erickson & Farkas 1991 (young); Flowers et al. 2001 (young); Stumpf & Stanley 1996* (college, advanced classes); Stricker et al. 2001 (college, students taking the GRE, accomplishments in science contests)	**INTERNATIONAL** *Multiple countries*: Hayes & Tariq 2000; Hayes 2001
No signif. difference					**EUROPE** *Britain*: Finn 1980 (biology) **INTERNATIONAL** *Multiple Countries*: G Vogel 1996* (6 out of 20 countries)		
Females have more				**MIDDLE EAST** *Kuwait*: Al Methen & Wilkinson 1988 **NORTH AMERICA** *United States*: Heilman 1933	**ASIA** *Thailand*: Klainin et al. 1989 **EUROPE** *Norway*: Undheim & Nordvik 1992 **MIDDLE EAST** *United Arab Emirates*: Hassan & Khalifa 1999 **NORTH AMERICA** *United States*: Edgerton & Britt 1947; J Harding 1981* (essay tests)		

5.3.4.2. Biological Science Knowledge

Regarding tests that have focused on knowledge in the biological sciences (live sciences), the findings have been quite mixed regarding any significant gender differences (Table 5.3.4.2).

Table 5.3.4.2. Biological science knowledge.

Nature of Any Difference	Prepubertal				Postpubertal	
				Childhood	Adolescent	Adult
Males have more				**ASIA** *China*: Ai 1945 **NORTH AMERICA** *United States*: Commins 1928	**NORTH AMERICA** *United States*: Stroud & Lindquist 1942; Hoste 1982	**EUROPE** *Germany*: R Lynn et al. 2004 **NORTH AMERICA** *United States*: Bridgeman 1988 (college); Cummings et al. 2000 (knowledge of aging, age 18-55)
No signif. difference					**NORTH AMERICA** *United States*: Jovanovic et al. 1994; DJ Young & Fraser 1994; Burkam et al. 1997; Beaton et al. 1996:49	
Females have more					**EUROPE** *Britain*: Bell 2001 **NORTH AMERICA** *United States*: Kahle et al. 1993; VE Lee & Burkam 1996:628 (young); Stumpf & Stanley 1996; Burkam et al. 1997 **OCEANIA** *Australia*: LH Parker 1992; MacCann 1995:181	

5.3.4.3. Chemistry Knowledge

Both studies of sex differences in knowledge of chemistry concluded that males exhibited greater knowledge than did females (Table 5.3.4.3).

Table 5.3.4.3. Chemistry knowledge.

Nature of Any Difference					Postpubertal	
					Adolescent	
Males more					**NORTH AMERICA** *United States*: Beaton et al. 1996:49; Stumpf & Stanley 1996	
No signif. difference						
Females more						

5.3.4.4. Computer Science Knowledge/Computer Literacy

Computer knowledge, or computer literacy, refers to the ability to understand and utilize a computer, usually in several capacities other than simply as one would use a typewriter. These abilities are either assessed by some test or simply by self-reports.

Studies of computer knowledge have largely concluded that males exhibit greater knowledge than do females (Table 5.3.4.4). One of the few exceptions was a study which students were trained in mixed-sex and same-sex classes. It revealed that following taking a mixed-sex class on computers, males did better than females, but that in a sex segregated class, no significant differences were found.

Table 5.3.4.4. Computer science knowledge/computer literacy.

Nature of Any Difference	Prepubertal				Postpubertal	
			Early Childhood	Childhood	Adolescent	Adult
Males have more			**NORTH AMERICA** *Canada*: Bernhard 1992 (computer programming knowledge)	**EUROPE** *Britain*: Leverett 1979 **NORTH AMERICA** *United States*: RD Hess & Miura 1985; DeRemer 1989; Bohlin 1993; Nelson & Watson 1995; D'Amico et al. 1995 (self-rated)	**EUROPE** *Britain*: TJ Harvey & Wilson 1985; Fife-Schaw et al. 1987; *Scotland*: Cully 1986; Durndell et al. 1987; Durndell & Thomson 1997; *Yugoslavia*: Kadijevich 2000; Shashaani 1993 (self-rated) **NORTH AMERICA** *Canada*: Crombie & Armstrong 1999* (students after taking a mixed-sex class in computers); *United States*: Fetler 1985; JS Sanders & Stone 1986 (computer programming); Stumpf & Kliene 1989; Stumpf & Stanley 1996 **OCEANIA** *New Zealand*: Vasil et al. 1987	**EUROPE** *Germany*: Dickhauser & Stiemeier-Pelster 2002 (college, self-rated); *Scotland*: Durndell 1991 (college); Durndell & Lightbody 1993 (college) **NORTH AMERICA** *Canada*: Royal Commission on Learning 1994 (college); *United States*: T Levin & Gordon 1989 (college); Durndell et al. 1995 (college); Shashaani 1997 (college); Volman 1997 (college); Kirkpatrick & Cuban 1998 (college); Mitra et al. 2000 (college)
No signif. difference					**NORTH AMERICA** *Canada*: Crombie & Armstrong 1999* (students after taking a sex-segregated class in computers)	**NORTH AMERICA** *United States*: Compton et al. 2003
Females have more						

5.3.4.5. Physical Science Knowledge

Numerous studies of knowledge dealing with the physical sciences (primarily physics, chemistry, astronomy, and geology) have concluded that the knowledge of males in these subject areas surpasses that of females. Two studies from Australia, however, failed to find a significant difference (Table 5.3.4.5).

Table 5.3.4.5. Physical science knowledge.

Nature of Any Difference				Postpubertal		Multiple Age Categories
				Adolescent	Adult	
Males have more				**EUROPE** *Britain*: S Johnson & Murphy 1986; Archenhold et al. 1987; S Johnson 1987; W Keys 1988; Preece et al. 1999; Bell 2001 **MIDDLE EAST** *Israel*: Zohar & Sela 2003 (physics exams) **NORTH AMERICA** *Canada*: Stroud & Lindquist 1942; BD Hobbs et al. 1979; GL Erickson & Erickson 1984; *United States*: Stroud & Lindquist 1942 (older); National Assessment of Education Progress 1978; J Harding 1979; Hueftle et al. 1983; TE Smith 1992; Jovanovic et al. 1994*; DJ Young & Fraser 1994*; Beaton et al. 1996:49; VE Lee & Burkam 1996:628 (young); Burkam et al. 1997* **INTERNATIONAL** *Multiple countries*: Beller & Gafni 1996; Comber & Keeves 1973 (19 countries); A Kelly 1978 **OCEANIA** *Australia*: MacCann 1995:181	**EUROPE** *Germany*: R Lynn et al. 2004	**NORTH AMERICA** *United States*: RT Osborne & Sanders 1954 (GRE)
No signif. difference				**OCEANIA** *Australia*: LH Parker 1992; Senior Secondary Assessment Board 1993		
Females have more						

5.3.5. Social/Behavioral Science Knowledge

The social/behavioral sciences include such disciplines as economics, geography, political science, psychology, and sociology. The results of studies of sex differences in knowledge in these areas (apart from course grades) are summarized below.

5.3.5.1. Social Science/Social Studies Knowledge in General

A few studies have assessed sex differences broadly ranging knowledge in the social sciences or social studies (including psychology). Most of these studies have concluded that males exhibit higher scores on these knowledge tests than do females (Table 5.3.5.1).

Table 5.3.5.1. Social science/social studies knowledge.

Nature of Any Difference	Prepubertal	Postpubertal
	Childhood	Adolescent
Males have more	**ASIA** *China*: Ai 1945 **NORTH AMERICA** *United States*: Ferrell 1949	**NORTH AMERICA** *United States*: Stroud & Lindquist 1942; Hedges & Nowell 1995:44; Stumpf & Stanley 1996 (psychology)
No signif. difference		
Females have more	**NORTH AMERICA** *United States*: Pomerantz et al. 2002:399	

5.3.5.2. Economics Knowledge

Limited research on sex differences in knowledge having to do with the field of economics failed to reveal any significant difference (Table 5.3.5.2).

Table 5.3.5.2. Economics knowledge.

Nature of Any Difference	Postpubertal	
	Adolescent	Adult
Males have more		**NORTH AMERICA** *United States*: M Hirschfield et al. 1995 (college, GRE scores by economics majors); E Goldsmith & Goldsmith 1997 (college)
No signif. difference	**NORTH AMERICA** *United States*: Stumpf & Stanley 1996	
Females have more		

5.3.5.3. Geography Knowledge

Nearly all relevant studies in Table 5.3.5.3 have indicated that males are more knowledgeable than females concerning geography. The exception involved prepubertal students.

Table 5.3.5.3. Geography knowledge.

Nature of Any Difference	Prepubertal	Postpubertal	
	Childhood	Adolescent	Adult
Males have more		**EUROPE** *Britain*: M Barrett & Farroni 1996*; *Italy*: M Barrett & Farroni 1996; *Netherlands*: Klinkenberg 1913 **NORTH AMERICA** *United States*: Beatty 1989*	**EUROPE** *Germany*: R Lynn et al. 2004 **NORTH AMERICA** *United States:* Beatty & Troster 1987* (college, locating places on a map); Beatty 1989* (young, adult, elderly, locating cities on outline maps); Beatty & Duncan 1990 (young, visuospatial measures of geographical knowledge); Gladue et al. 1990 (college); Straub & Seaton 1993 (college); JM Dabbs et al. 1998; Eve et al. 1994 (college); Beller & Gafni 1996; Montello et al. 1999 (college); Nelson et al. 1999 (young); Zinser et al. 2004 (college)
No signif. difference	**EUROPE** *Britain*: Rutland 1998		
Females have more			

5.3.5.4. History Knowledge

Most studies of sex differences in knowledge of history and current events have concluded that the knowledge of males surpasses that of females (Table 5.3.5.4).

Table 5.3.5.4. History knowledge.

Nature of Any Difference	Prepubertal				Postpubertal	
				Childhood	Adolescent	Adult
Males have more				**NORTH AMERICA** *United States*: Commins 1928; Basset 1929*	**EUROPE** *Holland*: Klinkenberg 1913 **NORTH AMERICA** *United States*: Basset 1929*; JH Coleman 1931 (current events); Stroud & Lindquist 1942; Stumpf & Klieme 1989; Stumpf & Stanley 1996 (American & European history) **INTERNATIONAL** *Several European Countries*: Wilberg & Lynn 1999	**EUROPE** *Germany*: R Lynn et al. 2004 **NORTH AMERICA** *Canada*: JA Hall & Kimura 1995 (sports history & current events)
No signif. difference						
Females have more				**NORTH AMERICA** *United States*: Heilman 1933		

5.3.5.5. Knowledge/Awareness of Gender-Typical Behavior and Preferences

A few studies have sought to determine if boys or girls have greater knowledge of gender differences in behavior and preferences. These studies suggest that among toddlers, girls have greater knowledge, whereas among school age children, boys do (Table 5.3.5.5).

Table 5.3.5.5. Knowledge/recognition of gender-typical behavior and preferences.

Nature of Any Difference	Prepubertal					
		Toddler		Childhood		
Males have more				**NORTH AMERICA** *Canada*: Serbin et al. 1993; *United States*: Ruble & Martin 1998		
No signif. difference						
Females have more		**NORTH AMERICA** *Canada*: Serbin et al. 2001; *United States*: SR Thompson 1975; Bem 1989; Poulin-Dubois et al. 1998 (toys & behavior)				

5.3.5.6. Politics/World Affairs Knowledge

Knowledge of politics and world affairs has been found to be greater among males than among females according to nearly all of the available research (Table 5.3.5.6).

Table 5.3.5.6. Politics/world affairs knowledge.

Nature of Any Difference	Prepubertal				Postpubertal		Multiple Age Categories
				Childhood	Adolescent	Adult	
Males have more				**EUROPE** *Britain*: Dowse & Hughes 1971* **NORTH AMERICA** *United States*: Greenstein 1961; Greenstein 1965*; Orum 1974	**EUROPE** *Britain*: Dowse & Hughes 1971* **NORTH AMERICA** *United States*: Greenstein 1965*; HJ Walberg 1969:49 (value politics more); Stroud & Lindquist 1942 (late adolescents); Dearden 1974	**EUROPE** *Germany*: R Lynn et al. 2004; *Northern Ireland*: Lynn et al. 2002:32 (college) **NORTH AMERICA** *United States*: S Bennett 1988; Carpini & Keeter 1991; Carpini & Keeter 1996; Verba et al. 1997; Carpini & Keeter 2000; KH Jamieson 2000; Sanbonmatsu 2003:370	**NORTH AMERICA** *United States*: RT Osborne & Sanders 1954 (GRE); Almond & Verba 1963; Jennings & Niemi 1971:74
No signif. difference					**NORTH AMERICA** *United States*: Stumpf & Stanley 1996 (government)	**NORTH AMERICA** *United States*: A Campbell et al. 1960 (political positions)	
Females have more							

5.3.6. Arts/Humanities Knowledge

Findings from research on sex differences in knowledge surrounding the arts and the humanities are reviewed in the following tables.

5.3.6.1. Arts/Humanities Knowledge

The evidence is inconsistent with respect to any gender differences in knowledge surrounding the arts and humanities (Table 5.3.6.1).

Table 5.3.6.1. Arts/humanities knowledge.

Nature of Any Difference					Postpubertal		Multiple Age Categories
					Adolescent	Adult	
Males have more						**EUROPE** *Northern Ireland*: Lynn et al. 2002:32 (college, art & music)	
No signif. difference					**NORTH AMERICA** *United States*: Stumpf & Stanley 1996 (Latin & French literature)	**EUROPE** *Germany*: R Lynn et al. 2004	
Females have more							**NORTH AMERICA** *United States*: RT Osborne & Sanders 1954 (GRE)

5.3.6.2. Literary/Language-Related Knowledge

Literary and language knowledge is either greater in the case of females or there is no significant gender difference according to the limited research (Table 5.3.6.2).

Table 5.3.6.2. Literary/language-related knowledge.

Nature of Any Difference	Prepubertal				Postpubertal		
				Childhood	Adolescent	Adult	
Males have more							
No signif. difference					**NORTH AMERICA** *United States*: Stunpf & Stanley 1996 (English, French, German)	**EUROPE** *Germany*: R Lynn et al. 2004	
Females have more				**EUROPE** *Ireland*: Lynn & Wilson 1993 (foreign language) **NORTH AMERICA** *United States*: JC Stanley 1993 (literature); Heilman 1933	**OCEANIA** *Australia*: MacCann 1995:181		

5.3.6.3. Music Knowledge

The one study of music-related knowledge concluded that the sexes do not significantly differ in this regard (Table 5.3.6.3).

Table 5.3.6.3. Music knowledge.

Nature of Any Dif-ference							
						Adult	
Males have more							
No signif. difference						**EUROPE** *Germany*: R Lynn et al. 2004	
Females have more							

5.4

LEARNING, MEMORY, AND RECALL

Learning, memory, and recall are all related concepts, so much so that it is impossible to make clear separations between them. This is because one of the primary methods of assessing whether or not a task has been learned is to see if the task is repeated under similar stimulus conditions, and doing so is presumably because the response has been remembered. Despite their interrelatedness, many studies have tended to focus attention more on one of these three concepts than on the other.

5.4.1. Learning Ability and Reinforcement

Numerous studies have been undertaken to assess gender differences in learning and behavioral reinforcement. A relatively large proportion of these studies have involved nonhuman subjects.

5.4.1.1. Learning Ability in General

Studies of learning ability in general have indicated that at least among rats, there is either no difference or a slight advantage for females (Table 5.4.1.1). For primates, inconsistent conclusions were reached.

Table 5.4.1.1. Learning ability in general.

Nature of Any Difference	Prepubertal	Postpubertal		Multiple Age Categories
	Infant	Adolescent	Adult	
Males better	**PRIMATE (EXCEPT APE)** *Rhesus Macaque*: Goldman 1975 (2.5-month-olds, object-reversal learning)	**NORTH AMERICA** *United States*: Burrow et al. 2004:277		
No signif. difference		**RODENT** *Rat*: Guillamon et al. 1986* (discriminant learning)	**RODENT** *Rat*: Guillamon et al. 1986* (discriminant learning)	
Females better	**PRIMATE (EXCEPT APE)** *Rhesus Macaque*: Bachevalier et al. 1989 (3-month-olds, discrimination learning)	**RODENT** *Rat*: H Bimonte & Denenberg 2000 (trial & error)		**APE** *Chimpanzee*: Lonsdorf 2005 (termite fishing)

5.4.1.2. Complexity of Learning Strategies

Two studies have concluded that males utilize more complex types of learning strategies than do females (Table 5.4.1.2).

Table 5.4.1.2. Learning strategies in general.

Nature of Any Difference	Postpubertal
	Adolescent
Males more complex	**NORTH AMERICA** *United States*: JM Royer et al. 1999; M Carr & Davis 2001
No signif. difference	
Females more complex	

5.4.1.3. Self-Regulated Learning

According to a couple of studies, females are more likely to engage in more specific self-regulated learning than is true for males, although another study failed to document a significant gender difference in this regard (Table 5.4.1.3).

Table 5.4.1.3. Learning strategies in general.

Nature of Any Difference	Postpubertal	
	Adolescent	Adult
Males more		
No signif. difference		**NORTH AMERICA** *United States*: CA Carroll & Gavalia 2002 (graduate students)
Females more	**NORTH AMERICA** *United States*: KE Ablard & Lipschultz 1998	**NORTH AMERICA** *United States*: BS Zimmerman & Martinez-Pons 1990 (college)

5.4.1.4. Paired Association Learning and Recall

Little to no significant sex differences in paired association learning and recall seem to exist in humans (Table 5.4.1.4).

Table 5.4.1.4. Paired association learning and recall.

Nature of Any Difference	Prepubertal	
	Early Childhood	Childhood
Males more		
No signif. difference	**NORTH AMERICA** *United States*: J Peterson 1972	**NORTH AMERICA** *United States*: Sitkei & Meyers 1969
Females more		**NORTH AMERICA** *United States*: HW Stevenson & Odom 1965a

5.4.1.5. Conditional Learning

According to one study, infant girls were faster at conditional learning than were infant boys (Table 5.4.1.5).

Table 5.4.1.5. Conditional learning.

Nature of Any Difference	Prepubertal
	Infant
Faster in males	
No signif. difference	
Faster in females	**NORTH AMERICA** *United States*: Stamps & Porges 1975

5.4.1.6. Learning Under Competitive Conditions

According to one study, males learn more under competitive conditions than do females (who tend to learn better under cooperative conditions; Table 5.4.1.6).

Table 5.4.1.6. Learning under competitive conditions.

Nature of Any Difference	Postpubertal
	Adolescent
Males better	**NORTH AMERICA** *United States*: PL Peterson & Fennema 1985 (classroom environment)
No signif. difference	
Females better	

5.4.1.7. Linguistic Learning

Several studies have concluded that females learn linguistic material faster and more accurately than do males, although some studies suggest that the differences are not statistically significant (Table 5.4.1.7).

Table 5.4.1.7. Linguistic learning.

Nature of Any Difference	Postpubertal	Multiple Age Categories
	Adult	
Males faster & more accurate		
No signif. difference	**NORTH AMERICA** *United States*: Wiens et al. 1988 (ages 19-51, auditory-verbal test)	**NORTH AMERICA** *United States*: Savage & Gouvier 1992 (auditory-verbal test, ages 16-76)
Females faster & more accurate	**NORTH AMERICA** *United States*: Bolla-Wilson & Bleecker 1986 (auditory-verbal learning test); Bleecker et al. 1988 (ages 40-89, auditory-verbal test); Reite et al. 1993 (college) **MIDDLE EAST** *Israel*: Vakil & Blachstein 1997 (ages 21-91, auditory-verbal test)	**NORTH AMERICA** *United States*: Bolla-Wilson & Bleeker 1986 **OCEANIA** *Australia*: Geffen et al. 1990 (ages 16-86, auditory-verbal test)

5.4.2. Operant Behavior

Operant behavior is produced by an animal in response to some set of enviromental stimuli. Studies of sex differences in various types of operant behavior are reviewed in the following section.

5.4.2.1. Operant Response Rate to Reinforcement in General

One study found that among prepubertal rats, males emitted more operant responses to reinforcement than did female rats (Table 5.4.2.1).

Table 5.4.2.1. Operant response rate to reinforcement in general.

Nature of Any Difference	Prepubertal
	Childhood
Males more (faster)	**RODENT** *Rat*: Zimmerberg et al. 1989
No signif. difference	
Females more (faster)	

5.4.2.2. Operant Responsiveness to Social Rather Than Non-Social Reinforcement

One study of young chickens concluded that females were more likely than males to exhibit operant responses to social reinforcement rather than to non-social reinforcement (Table 5.4.2.2).

Table 5.4.2.2. Operant responsiveness to social rather than nonsocial reinforcement.

Nature of Any Difference	Prepubertal
	"Toddlers"
Males more	
No signif. difference	
Females more	**BIRD** *Chicken*: Vallortigara et al. 1990

5.4.2.3. Active Avoidance Learning

Active avoidance learning requires subjects to engage in specific acts to avoid being hurt or injured in an experimental task. Rats have been the usual subjects used in active avoidance learning experiments. Table 5.4.2.3 shows that the majority of studies have concluded that females are faster than males at such learning tasks.

Table 5.4.2.3. Active avoidance learning.

Nature of Any Dif-ference	Postpubertal	Multiple Age Categories
	Adult	
Faster in males	**RODENT** *Mouse*: Wiltgen et al. 2001; *Rat*: Maren et al. 1994; Choleris et al. 2000 (bad tastes); *Rat*: Kirk & Blampied 1985 (inescapable shock, following pain exposure); Steenbergen et al. 1989 (inescapable shock, following pain exposure)	
No signif. difference		**RODENT** *Rat*: JS Milner 1976
Faster in females	**RODENT** *Hamsters*: Boice et al. 1968; Ashe & McCain 1972; *Rat*: Nakamura & Anderson 1962*; S Levine & Broadhurst 1963* (in a shuttlebox); RD Savage & Eysenck 1964; WW Beatty & Beatty 1970 (young, painful stimuli); Lehrner et al. 1971 (response suppression); Denti & Epstein 1972 (young, painful stimuli); Denti & Negroni 1972 (young, painful stimuli); J Archer 1975 (painful stimuli); Ray & Barrett 1975; HJ Davis et al. 1976 (escape conditioning); WW Beatty 1979 (painful stimuli); van Oyen et al. 1980	**RODENT** *Rat*: Levine & Broadhurst 1963*; Nakamura & Anderson 1962*; Pare 1969 (painful stimuli); Beatty & Beatty 1970; Beatty et al. 1971; Scouten & Beatty 1971 (painful stimuli); Denti & Epstein 1972; Archer 1975; Bauer 1978; Van Oyen et al. 1981b; Hauser & Gandelmon 1983; Heinsbroek et al. 1983

5.4.2.4. Passive Avoidance Learning

Passive avoidance learning occurs when an individual does nothing rather than endure some noxious stimulus. As shown in Table 5.4.2.4, the evidence is quite mixed regarding any sex difference in such learning, at least among rats.

Table 5.4.2.4. Passive avoidance learning.

Nature of Any Dif-ference	Postpubertal	Multiple Age Categories
	Adolescent	
Males learn faster		**RODENT** *Rat*: Klemm 1969; Denti & Epstein 1972; Heinsbroek et al. 1988 (shock passive avoidance task)
No signif. difference		
Females learn faster	**RODENT** *Rat*: KC Chambers 1976	**RODENT** *Rat*: Van Oyen et al. 1979; Van Oyen et al. 1980; Van Oyen et al. 1981a; Van Oyen et al. 1981b; Heinsbroek et al. 1983; Van Haaren & Van de Poll 1984a; Van Haaren & Van de Poll 1984b; Van Haaren & Van de Poll 1986

5.4.2.5. Response Rate to Reinforcement

Several studies have sought to determine if a sex difference exists among rats in the rate of responding to reinforcement. Whether the reinforcement is intermittent or continuous, males tend to respond more rapidly than do females (Table 5.4.2.5).

Table 5.4.2.5. Response rate to reinforcement.

Nature of Any Difference					Postpubertal		Multiple Age Categories
						Adult	
Males faster						**RODENT** *Rat*: Ough et al. 1972 (young, intermittent); WW Beatty 1973 (young, intermittent); PT Wong & Traupman 1973 (young, intermittent); WW Beatty et al. 1975 (young, intermittent); RD Miller 1975 (intermittent); WW Beatty 1977 (young, intermittent); Harrington 1979 (young, continuous); Cales & Guillamon 1986 (young, continuous); Van Hest et al. 1987a (young, continuous); Van Hest et al. 1987b (young, intermittent); Van Hest et al. 1989 (young, continuous); Guillamon et al. 1990 (young, continuous)	**RODENT** *Rat*: Heinsbroek et al. 1987
No signif. difference							
Females faster							

5.4.3. Extinction of a Learned Response

Extinction of a learned behavior has to do with the amount of time or the number of responses lapsing between the learning of a particular response and the virtual disappearance of the behavior after reward for it has been discontinued.

5.4.3.1. Extinction of a Learned Avoidance Response

Among rats, studies have been inconsistent with regard to any possible gender difference in the extinction of a learned avoidance response (Table 5.4.3.1).

Table 5.4.3.1. Extinction of a learned avoidance response.

Nature of Any Difference					Postpubertal		Multiple Age Categories
						Adult	
Males faster						**RODENT** *Rat*: Ikard et al. 1972 (young); Brush et al. 1985 (young)	**RODENT** *Rat*: WW Beatty et al. 1971
No signif. difference							**RODENT** *Rat*: Heinsbroek et al. 1983
Females faster						**RODENT** *Rat*: KC Chambers 1976 (young); KC Chambers & Sengstake 1976 (young)	

5.4.3.2. Retention of Passive Avoidance Learning

Retention of passive avoidance learning has to do with the amount of time or trials lapsing between a learned response and the extinction of that response. No consistent patterns have been found among rodents regarding the length of retention for such learning (Table 5.4.3.2).

Table 5.4.3.2. Retention of passive avoidance learning.

Nature of Any Difference					Postpubertal		
						Adult	
Males retain longer						**RODENT** *Gerbil*: Riddell et al. 1975; *Rat*: Beatty et al. 1973; Bengelloun et al. 1976; Denti & Epstein 1972	
No signif. difference							
Females retain longer						**RODENT** *Rat*: Pogun et al. 1992 (pole-jump active avoidance task)	

5.4.3.3. Extinction of Learned Taste Aversion

Regarding the extinction of learned taste aversion, female rats have been shown to do so at a faster rate than male rats (Table 5.4.3.3).

Table 5.4.3.3. Extinction of learned taste aversion.

Nature of Any Difference					Postpubertal		Multiple Age Categories
					Adolescent		
Males faster							
No signif. difference							
Females faster					**RODENT** *Rat*: J Weinberg et al. 1982		**RODENT** *Rat*: KC Chambers 1976; KC Chambers & Sengstake 1976; KC Chambers & Sengstake 1978

5.4.4. Memory and Recall

The ability to recall experiences or information that one has encountered is important to many aspects of life. Studies of gender differences in various aspects of this ability are summarized below.

5.4.4.1. Memory and Memory Recall in General

As shown in Table 5.4.4.1, the findings have been mixed. In all likelihood, many of the inconsistencies are explainable in terms of different types of memory tasks involved.

Table 5.4.4.1. Memory and memory recall in general.

Nature of Any Difference	Prepubertal				Postpubertal		Multiple Age Categories
	Infant		Early Childhood	Childhood	Adolescent	Adult	
Males more				**EUROPE** *Germany*: Lem 1911*; Aall 1913a* **NORTH AMERICA** *United States*: Wheeler & Dusek 1973 (line-drawing) **OCEANIA** *Australia*: Mwangi 1995 (different conceptual categories)		**EUROPE** *Germany*: Breukink 1910 (young) **NORTH AMERICA** *United States*: Myers 1913 (young); Cahill et al. 2004 (emotionally arousing photos)	**EUROPE** *Britain*: Acker 1986 (alcoholics, immediate recall)
No signif. difference	**NORTH AMERICA** *United States*: Allen 1931		**NORTH AMERICA** *United States*: Bryan 1934*	**EUROPE** *Switzerland*: Fischler & Ullert 1929* **NORTH AMERICA** *United States*: Bryan 1934*; Stevenson et al. 1968* (answering questions about an oral story); Stevenson et al. 1970 (answering question about a story); Leifer et al. 1971 (memory of fairy tale characters); Anders et al. 1972* (digit lists); Harris & Burke 1972 (digits); Keenan 1972 (sequences); Steele & Horowitz 1973 (line-drawing)	**EUROPE** *Switzerland*: Fischler & Ullert 1929* **NORTH AMERICA** *United States*: Hobson 1947; Sarason & Harmatz 1965 (serial learning task); MA Lewis & Ormrod 1985 (different conceptual categories)	**ASIA** *Japan*: Chan 2001 (ages 18-50, Color Trails Test, hospital patients) **EUROPE** *Britain*: McGue & Bouchard 1989* (Sternberg memory search); *Switzerland*: Fischler & Ullert 1929* **NORTH AMERICA** *United States*: Isen 1970 (recall and recognition of a confederate's behavior); Anders et al. 1972* (digit lists); Blum 1972 (elderly, digit memory); DeFazio 1973 (word repetition); McGue & Bouchard 1989* (Sternberg memory search); D'Elia et al. 1994 (ages 18-89, Color Trails Test); Janowsky et al. 1998 (both verbal and nonverbal); Canli et al. 2002 (emotionally arousing photos)	**NORTH AMERICA** *United States*: Spitz et al. 1972 (digit); Ponton et al. 1996 (ages 16-75, Hispanic, Color Trail Tes)
Females more			**NORTH AMERICA** *United States*: Baldwin & Stecher 1924; Goodenough 1927	**EUROPE** *Germany*: Lem 1911*; Aall 1913a* **NORTH AMERICA** *United States*: Pyle 1913b; Gates 1916b*; Mulhall 1917; Terman 1917; Terman & Cuneo 1918; Pyle 1920*; Pressey & Pressey 1921; Book & Meadow 1928*; McGeoch 1928*; Sitkei & Meyers 1969 (letter sequences); Asher & Markell 1974 (reading material)	**NORTH AMERICA** *United States*: Pyle 1920*; Book & Meadow 1928*; McGeoch 1928*; Hobson 1947 (young, rote memory); Havighurst & Breese 1947 (young, rote memory); Tulving & Pearlstone 1966 (immediate and cued recall); Stevenson et al. 1968* (answering questions about an oral story); Backman 1972 (verbal memory); Samuel 1983 (rote memory)	**EUROPE** *Germany*: Schramm 1911 (young); Aall 1913b (young); J Smith & M Baltes 1998 (elderly); *Netherlands*: Aartsen et al. 2004:37 (elderly) **NORTH AMERICA** *United States*: Strong 1915 (young); Gates 1916b* (young); Gates 1917 (young); Wilkie & Eisdorfer 1977 (serial learning task); Stumpf & Jackson 1994 (medical school applicants); Anooshian & Seibert 1996 (college); Schaie 1996 (elderly) **RODENTS** *Rat*: Warren & Juraska 2000:235 (in estrus)	**NORTH AMERICA** *United States*: Skowronski & Thompson 1990 **OCEANIA** *Australia*: Ivison 1977

5.4.4.2. Short-Term Memory

Short-term memory usually extends less than a few hours. As shown in Table 5.4.4.2, most studies have found no significant sex differences in such memory.

Table 5.4.4.2. Short-term memory.

Nature of Any Difference	Prepubertal	Postpubertal	
	Childhood	Adolescent	Adult
Males better			
No signif. difference	**NORTH AMERICA** *United States*: Mathews & Fozard 1970; Hagen & Hunstman 1971 (retarded children, picture location); McCarver 1972 (serial position); Sabo & Hagen 1972 (picture location)	**NORTH AMERICA** *Canada*: Hakstian & Cattell 1975:303	
Females better			**ASIA** *Russia*: Volf 1996 (college)

5.4.4.3. Long-Term Memory

The one study of gender differences in long-term memory concluded that females were superior to males in this regard, at least regarding the memory of odors (Table 5.4.4.3).

Table 5.4.4.3. Long-term memory.

Nature of Any Difference	Postpubertal
	Adult
Males better	
No signif. difference	
Females better	**NORTH AMERICA** *United States*: Lehrner 1993 (of odors)

5.4.4.4. Earliest Age of Recalling a Specific Childhood Experience

How far back in childhood does one's memory go? Studies undertaken to assess gender differences in the earliest age at which adults can remember a specific experience have concluded either that females are able to recall events at an earlier age than males or that there is no significant gender difference (Table 5.4.4.4).

Table 5.4.4.4. Earliest age of recalling of a specific childhood experience.

Nature of Any Difference	Postpubertal
	Adult
Males earlier	
No signif. difference	**NORTH AMERICA** *United States*: Kihlstrom & Harackiewicz 1982; Strongman & S Kemp 1991
Females earlier	**NORTH AMERICA** *United States*: Potwin 1901; Dudycha & Dudycha 1933; M Mullens 1993

5.4.4.5. Age-Related Decline in Memory

In adulthood, memory ability tends to decline. As shown in Table 5.4.4.5, most studies have failed to document a significant gender difference in the rate of this decline, although one study suggested that males exhibit greater deterioration in memory ability than females at least regarding memory of verbal information.

Table 5.4.4.5. Age-related decline in memory.

Nature of Any Difference	Postpubertal
	Adult
Males earlier	**NORTH AMERICA** *United States*: Larrabee & Crook 1993 (verbal memory)
No signif. difference	**NORTH AMERICA** *United States*: Larrabee et al. 1988 (verbal memory); Elias et al. 1993 (overall memory); Herlitz et al. 1997 (episodic memory)
Females earlier	

5.4.4.6. Use of Semantic Memory Strategies

A semantic memory strategy is one in which linguistic rules are followed to assist in remembering. As shown in the two studies cited in Table 5.4.4.6, this type of memory appears to be more common among females than males.

Table 5.4.4.6. Use of semantic memory strategies.

Nature of Any Difference	Postpubertal
	Adult
Males more	
No signif. difference	
Females more	**EUROPE** *Sweden*: Oberg et al. 2002 (to remember odors);Larsson et al. 2003 (to remember odors)

5.4.4.7. Facial Recognition and Recall

Quite a number of studies have investigated sex differences in the ability to recall faces that had been seen at some earlier point in time. Most of these studies have concluded that females exhibited greater facial recognition and recall ability than males (Table 5.4.4.7). Some researchers have classified face recognition as a type of episodic memory (Lewin & Herlitz 2002:126), as discussed separately in a table below.

Table 5.4.4.7. Facial recognition and recall.

Nature of Any Difference	Prepubertal	Postpubertal	
	Childhood	Adolescent	Adult
Males better			
No signif. difference	**NORTH AMERICA** *United States*: Everhart et al. 2001		**EUROPE** *Sweden*: Lewin & Herlitz 2002* (male faces)
Females better		**EUROPE** *Sweden*: C Lewin et al. 2001*; Herlitz & Yonker 2002:113* **NORTH AMERICA** *United States*: AG Goldstein & Chance 1971*	**EUROPE** *Sweden*: Wahlin et al. 1993* (elderly); RD Hill et al. 1995* (elderly); Herlitz et al. 1997 (college, children faces); C Lewin et al. 2001*; Herlitz & Yonker 2002:113*; Lewin & Herlitz 2002* (female faces) **NORTH AMERICA** *Canada*: McKelvie 1981 (young, female faces, children faces); *United States*: Goldstein & Chance 1970; AG Goldstein & Chance 1971*; McKelvie et al. 1993 (children faces); Wahlin et al. 1993* (elderly); RD Hill et al. 1995* (elderly); Gur et al. 2001; C Lewin & Herlitz 2002 (women's faces); DB Wright & Sladden 2003 (same-sex faces)

5.4.4.8. Recalling Acquaintances' Names and Characteristics

Most studies of people's abilities to recall the names and specific characteristics of acquaintances have concluded that females are better than males (Table 5.4.4.8).

Table 5.4.4.8. Recalling acquaintances' names and characteristics.

Nature of Any Difference	Postpubertal
	Adult
Males better	
No signif. difference	**NORTH AMERICA** *United States*: Basso et al. 2000:233 (young)
Females better	**NORTH AMERICA** *United States*: Exline 1957 (young); Witryol & Kaess 1957 (young); Exline 1962 (young); Larrabee & Crook 1993 (names)

5.4.4.9. Recall of Auditory Stimuli (Non-Linguistic)

One study concluded that males were better than females at recalling familiar auditory stimuli of a non-linguistic nature (Table 5.4.4.9).

Table 5.4.4.9. Recall of auditory stimuli (non-linguistic).

Nature of Any Difference	Prepubertal
	Childhood
Males better	**LATIN AMERICA** *Peru*: HW Stevenson et al. 1990
No signif. difference	
Females better	

5.4.4.10. Recalling Emotional Experiences

Gender differences in the ability to recall specific emotional experiences have been investigated by several researchers. All have concluded that females were superior to males (Table 5.4.4.10).

Table 5.4.4.10. Recalling emotional experiences.

Nature of Any Difference	Prepubertal	Postpubertal
	Childhood	Adult
Males better		
No signif. difference		
Females better	**OCEANIA** *Australia*: PJ Davis 1999	**NORTH AMERICA** *United States*: Christianson & Loftus 1987; Fujita et al. 1991; MM Bradley et al. 1992 (emotion-provoking pictures); LaBar & Phelps 1998 (emotion-laden words); Seidlitz & Diener 1998; Canli et al. 2002; Cahill 2003

5.4.4.11. Recalling Episodes of Experiences (Episodic Memory)

The term *episodic memory* has been frequently used to refer to the ability to accurately recall details of an experience that one has had. As shown in Table 5.4.4.11, gender differences in episodic memory have been investigated numerous times, and most studies have concluded that females usually exhibit superior recall of these events than do males.

Table 5.4.4.11. Recalling episodes of experiences (episodic memory).

Nature of Any Difference	Prepubertal		Postpubertal		Multiple Age Categories
	Early Childhood	Childhood	Adolescent	Adult	
Males better		**EUROPE** *Britain*: Temple & Cornish 1993* (faces)	**EUROPE** *Sweden*: C Lewin 2001* (visual-spatial); Herlitz & Yonker 2002* (visual-spacial)	**EUROPE** *Sweden*: C Lewin et al. 2001* (full, visual-spatial); Herlitz & Yonker 2002* (visual-spatial)	
No signif. difference			**EUROPE** *Sweden*: C Lewin 2001*; Herlitz & Yonker 2002*	**EUROPE** *Sweden*: Herlitz et al. 1999 (young); C Lewin 2001*; Herlitz & Yonker 2002* **NORTH AMERICA** *United States*: Botwinick & Storandt 1980; RP Hart & O'Shanick 1993* (pictures, young); Ionescu 2000 (college); Ionescu 2002 (college)	**NORTH AMERICA** *United States*: McKelvie et al. 1993
Females better	**NORTH AMERICA** *United States*: Fivush et al. 1995	**EUROPE** *Britain*: Temple & Cornish 1993* (words) **NORTH AMERICA** *United States*: Buckner & Fivush 1998	**EUROPE** *Sweden*: Herlitz 1999* (language related); C Lewin 2001* (verbal) **NORTH AMERICA** *United States*: Larabee & Crook 1993* (language related); Zelinski et al. 1993* (language related); Stumpf & Eliot 1995 (visual)	**EUROPE** *Netherlands*: van Wijk & Kolk 1997 (ill health/illness symptoms); *Sweden*: Herlitz et al. 1999* (language related); C Lewin 2001* (verbal); Maitland et al. 2004 **NORTH AMERICA** *Canada*: Galea & Kimura 1993 (young); Eals & Silverman 1994 (young); *United States*: Pennebaker 1982 (college, ill health/illness symptoms); JH Kramer et al. 1988 (language related); RN Jamison et al. 1989 (ill health/illness symptoms); M Ross & Holmberg 1990 (young); Skowronski & Thompson 1990 (college); A Friedman & Pines 1991 (young); Hultsch et al. 1991* (elderly, language related); M Ross & Holmberg 1992; Lehrner 1993 (young); RP Hart & O'Shanick 1993* (verbal material, young); Larabee & Crook 1993* (language related); Wahlin et al. 1993 (elderly); Zelinski et al. 1993* (full, language related, elderly); RD Hill et al. 1995 (elderly, language related); Rabbitt et al. 1995 (elderly); Sehulster 1995; Herlitz et al. 1997* (young); Herlitz et al. 1999 (young)	**EUROPE** *Sweden*: Herlitz et al. 1997*; Lindholm & Christianson 1998 **NORTH AMERICA** *United States*: Bolla-Wilson & Bleecker 1986; Kramer et al. 1988; Geffen et al. 1990; Hultsch et al. 1991*; RL West et al. 1992; Larabee & Crook 1993*; Schaie & Willis 1993; Yarmey 1993; deVries et al. 1995; Berenbaum et al. 1997; Kramer et al. 1997

5.4.4.12. Recalling the Location of Objects in Space (Static Object Location Memory)

Voltaire, a famous 18th Century philosopher, was quoted as once declaring, "I hate women because they always know where things are" (Craig et al. 2004:270). Numerous studies have assessed gender differences in the ability to recall the physical location of objects. These tests typically involve researchers arranging a few dozen objects in a room (or in a drawing of a room) and giving subjects a minute or so to fix the position of the objects in their memories. Then subjects are exited from the room and sometime later are asked to demonstrate their recollections of the objects' positions. In recent years, computer simulations of these procedures have been developed (Crook et al. 1990). As shown in Table 5.4.4.12, most studies of humans have shown that females are better at recalling the locations of objects than are males. Such a conclusion is consistent with the conclusion drawn from a meta-analysis (Voyer et al., 2007). This type of memory has been linked closely to verbal paired association learning ability but does not appear to be linked to spatial reasoning ability (Crook et al. 1990:829).

Table 5.4.4.12. Recalling the location of objects in space (static object location memory).

Nature of Any Difference	Prepubertal				Postpubertal		Multiple Age Categories
				Childhood	Adolescent	Adult	
Males better					**NORTH AMERICA** *United States*: Druker & Hagen 1969	**NORTH AMERICA** *United States*: Kail & Siegel 1978 (young) **RODENT** *Mouse*: Frick & Cresack 2003	
No signif. difference				**NORTH AMERICA** *United States*: I Cherney & Ryalls 1999	**NORTH AMERICA** *United States*: McCarver & Ellis 1972; Barnfield 1999*	**EUROPE** *Britain*: Rahman et al. 2005 (spatial location memory); *Italy*: Capitan et al. 1991 (Block Tapping Test) **NORTH AMERICA** *Canada*: TW James & Kimura 1997 (college, pairs of objects switched locations); *United States*: Epting & Overman 1998 (college, spatial array test)	
Females better				**NORTH AMERICA** *Canada*: Choi & Silverman 2003*; *United States*: Wheeler & Dusek 1973	**NORTH AMERICA** *Canada*: Choi & Silverman 2003*	**NORTH AMERICA** *Canada*: Silverman & Eals 1992 (college); Eals & Silverman 1994 (college); TW James & Kimura 1997 (college); Tottenham et al. 2003; *United States*: D McGuinness & Sparks 1983 (young); Crook et al. 1990 (full & elderly); Hoesing et al. 1994 (young); Gaulin et al. 1997; McBurney et al. 1997 (college); JM Dabbs et al. 1998 (college); Vecchi & Girelli 1998; Postma et al. 1998; Sandstrom et al. 1998 (young); Barnfield 1999*; Montello et al. 1999 (college); Postma et al. 1999; GM Alexander et al. 2002 (young); LJ Levy et al. 2005 (pairs of objects switched location)	**NORTH AMERICA** *United States*: RG Colledge 1988 (recognizing a photo of home neighborhood); Montello et al. 1999

5.4.4.13. Recalling “Masculine” (vs. “Feminine”) Events

Whether males or females are better able to recall events that are considered “masculine” in nature has been investigated by a few studies. They have all concluded that “masculine” events such as sports scores and the proper location of automotive parts are recalled more accurately by males than by females (Table 5.4.4.13).

Table 5.4.4.13. Recalling “masculine” (vs. “feminine”) events.

Nature of Any Difference	Prepubertal					
		Toddler	Early Childhood			
Males better		**NORTH AMERICA** *United States*: Boston & Levy 1991	**NORTH AMERICA** *United States*: Sen 1999			
No signif. difference						
Females better						

5.4.4.14. Recall of Visual Stimuli (Other Than Faces)

Numerous studies have compared males and females in terms of recalling visual stimuli other than human faces. As shown in Table 5.4.4.14, these studies have reached conflicting conclusions, with most indicating either no significant sex difference or that males are better than females.

Table 5.4.4.14. Recall of visual stimuli (other than faces).

Nature of Any Difference					Postpubertal		Multiple Age Categories
						Adult	
Males better						**LATIN AMERICA** *Columbia*: Ardila & Rosselli 1989 (age 55, Rey-Osterrieth Complex Figure Test) **NORTH AMERICA** *Canada*: King 1981 (brain damaged patients, Rey-Osterrieth Complex Figure Test)	**EUROPE** *Britain*: Bennett-Levy 1984 (ages 17-49, Rey-Osterrieth Complex Figure Test) **LATIN AMERICA** *Columbia*: Ardila et al. 1989 (ages 16-65, illiterate participants, Rey-Osterrieth Complex Figure Test)
No signif. difference						**EUROPE** *Sweden*: Lewin et al. 2001 (pictures) **NORTH AMERICA** *United States*: Berry et al. 1991 (elderly, Rey-Osterrieth Complex Figure Test); Boone et al. 1993 (ages 45-83, Rey-Osterrieth Complex Figure Test); Ionescu 2000 (words & pictures); Ionescu 2002 (words & pictures)	
Females better						**EUROPE** *Sweden*: Herlitz et al. 1999 (pictures) **NORTH AMERICA** *United States*: Denckla & Rudel 1974 (pictures of objects)	

5.4.4.15. Recalling Word Lists/Object Names/Number Lists

Numerous studies have compared males and females regarding their abilities to recall lists of words or the names given to objects. One of the most widely used tests for measuring such abilities is called the digit span test (Stevenson et al. 1990:541; Wechsler 1991). According to Table 5.4.4.15, the majority of relevant studies have either concluded that no significant gender differences exist or that females are superior to males in such recall ability.

Table 5.4.4.15. Recalling word lists/object names/number lists.

Nature of Any Difference	Prepubertal			Postpubertal		Multiple Age Categories
	Toddler	Early Childhood	Childhood	Adolescent	Adult	
Males better		**NORTH AMERICA** *United States*: SG Sapir 1966:989 (auditory lists of numbers)			**NORTH AMERICA** *United States*: Koen 1966* (without verbal labels)	
No signif. difference	**NORTH AMERICA** *United States*: Fagan 1971; Fagan 1972; Hall & Halperin 1972	**NORTH AMERICA** *United States*: Appel et al. 1972*	**EUROPE** *France*: Dellatolas et al. 2003:328 (young, specific categories) **LATIN AMERICA** *Peru*: HW Stevenson et al. 1990 **NORTH AMERICA** *United States*: Flavell et al. 1966; Hall & Ware 1968; Druker & Hagen 1969; Horowitz et al. 1969; Ross & Youniss 1969; Leventhal & Anderson 1970 (recall of game scores); Cole et al. 1971; Friedrichs et al. 1971; Rothbart 1971; Ward & Legant 1971; Weener 1971; Cramer 1972; Davies 1972; Hagen et al. 1973; Moynahan 1973	**NORTH AMERICA** *United States*: Appel et al. 1972*	**EUROPE** *Sweden*: Maitland et al. 2004 (vocabulary task) **NORTH AMERICA** *United States*: Lott et al. 1970b(nonsense syllables); Laurence & Trotter 1971; Epstein 1974 (college); Waters & Schreiber 1991* (college); Knez & Enmarker 1998 (young); Ionescu 2000 **OCEANIA** *Australia*: Liddicoat 1961 (WAIS Digit Span)	
Females better			**EUROPE** *France*: De Agostini et al. 1992 (precisely repeating words to a researcher); Dellatolas et al. 2003 (precisely repeating words to a researcher) **NORTH AMERICA** *United States*: Kossuth et al. 1971; Amster & Wiegand 1972; Appel et al. 1972*; Finley & Frenkel 1972; Shepard & Ascher 1973; RB May & Hutt 1974	**EUROPE** *Britain*: Duggan 1950 **NORTH AMERICA** *United States*: Waters & Schreiber 1991:326* (teens)	**EUROPE** *Sweden*: RD Hill et al. 1995 (elderly) **NORTH AMERICA** *United States*: Koen 1966* (with verbal labels); Meinke 1969 (young); Milburn et al. 1970; Kail & Siegel 1978 (young); JH Kramer et al. 1988* (young, word lists); Geffen et al. 1990 (word lists); Trahan & Quintana 1990 (word lists); McGuinness et al. 1990 (young); Ganguli 1991 (elderly); RP Hart & O'Shanick 1993 (word lists); Berenbaum et al. 1997 (young)	**EUROPE** *Britain*: CH Ernest & Paivio 1971; Herman et al. 1992 **NORTH AMERICA** *United States*: Orsini et al. 1981a; Bleecker et al. 1988; JH Kramer et al. 1988; Ruff et al. 1989

5.4.4.16. Reminiscing About Social Experiences

The limited number of studies undertaken to assess gender differences in people's tendencies to reminisce about social experiences have concluded that females reminisce more than males (Table 5.4.4.16).

Table 5.4.4.16. Reminiscing about social experiences.

Nature of Any Difference	Postpubertal	Multiple Age Categories
	Adult	
Males do so more		
No signif. difference		
Females do so more	**NORTH AMERICA** *United States*: JM Fitzgerald & Lawrence 1984 (elderly); Hultsch et al. 1991 (stories); Zelinski et al. 1993 (stories)	**NORTH AMERICA** *United States*: M Ross & Holmerg 1990

5.5
SLEEP AND RELATED PHENOMENA

Several studies have investigated possible gender differences surrounding sleep. Also considered in this topical area are gender differences in dreaming.

5.5.1. Sleeping and Dreaming

Sleeping is widespread in the animal kingdom, and may be universal among mammals. Dreaming also may be fairly common among higher animals. Nevertheless, nearly all of the research on sex differences in both phenomena is confined to studies of humans.

5.5.1.1. Time Spent Sleeping

Studies of gender differences in the amount of time spent sleeping have either concluded that females sleep more than males or that no significant differences exist (Table 5.5.1.1).

Table 5.5.1.1. Time spent sleeping.

Nature of Any Difference	Prepubertal				Postpubertal	
	Infant			Childhood	Adolescent	Adult
Males spend more						
No signif. difference	**EUROPE** *Britain*: R Ashton 1971 **NORTH AMERICA** *United States*: Parmelee et al. 1961; Moss & Robson 1970; Boismier et al. 1974; Hoppenbrouwers et al. 1989			**EUROPE** *France*: Guerin et al. 2001	**ASIA** *Japan*: Harada & Takeuchi 2001	
Females spend more	**NORTH AMERICA** *United States*: RQ Bell & Darling 1965; HA Moss 1967; HA Moss 1974; S Phillips et al. 1978; AC Cornwell 1992; Bach et al. 2000					**EUROPE** *Netherlands*: van Hilten et al. 1993 (elderly); *Switzerland*: Wirz-Justice et al. 1991 **NORTH AMERICA** *United States*: Hoch et al. 1988 (elderly); Reyner et al. 1995; Jean-Louis et al. 1997; Lindberg et al. 1997 (young) **OCEANIA** *Papua New Guinea*: Siegmund et al. 1998

5.5.1.2. Sleep Spindles

Sleep spindles are a type of brain wave pattern that predominantly occurs during sleep. As shown in Table 5.5.1.2, females appear to exhibit more sleep spindles than males.

Table 5.5.1.2. Sleep spindles.

Nature of Any Difference						Postpubertal
						Adult
Males have more						
No signif. difference						
Females have more						**EUROPE** *Finland*: Huupponen et al. 2002 (in the left hemisphere) **NORTH AMERICA** *United States*: Gaillard & Blois 1999

5.5.1.3. Sleep Quality (Sound Sleeping)

Sleep quality is usually assessed in terms of the absence of frequent tossing and turning in bed. Most studies have concluded that females exhibit greater sleep quality than do males (Table 5.5.1.3).

Table 5.5.1.3. Sleep quality (sound sleeping).

Nature of Any Difference	Postpubertal
	Adolescent
Males more	
No signif. difference	**EUROPE** *Italy*: Giannotti et al. 2002
Females more	**ASIA** *Japan*: Gaina et al. 2005; *Taiwan*: Gau 1995 **EUROPE** *Italy*: Giannotti et al. 1997

5.5.1.4. Sleeping With Parents

One study concluded that boys were more likely than girls to sleep with their parents when they were toddlers (Table 5.5.1.4).

Table 5.5.1.4. Sleeping with parents.

Nature of Any Difference	Prepubertal
	Toddler
Males more	**NORTH AMERICA** *United States*: Billingham & Zentall 1996 (based on reports of college students)
No signif. difference	
Females more	

5.5.1.5. Snoring

The limited research on gender differences in snoring has concluded that it is more common for males than for females (Table 5.5.1.5).

Table 5.5.1.5. Snoring.

Nature of Any Difference	Multiple Age Categories
Males more	**EUROPE** *Sweden*: Larsson et al. 2003 (self-report) **NORTH AMERICA** *United States*: CE Ross & Bird 1994
No signif. difference	
Females more	

5.5.2. Dreaming and Fantasizing

A considerable number of studies have investigated gender differences in different aspects of dreaming, both in terms of dream frequency and especially dream content. The results are reviewed in this section.

5.5.2.1. Dreaming, Frequency of Recalling

Several studies have sought to determine if dreaming is more common in one sex than in the other. As Table 5.5.2.1 indicates, nearly all of these studies are in agreement that females dream more than do males, or at least recall having done so, with the possible exception of children.

Table 5.5.2.1. Dreaming, frequency of recall.

Nature of Any Difference	Prepubertal				Postpubertal		Multiple Age Categories
				Childhood	Adolescent	Adult	
Males more							
No signif. difference				**NORTH AMERICA** *United States*: Foulkes et al. 1974* (5-6 year olds); Foulkes et al. 1978* (7-8 years olds)			**EUROPE** *Austria*: Stepansky et al. 1998 (14-69 year olds)
Females more				**NORTH AMERICA** *United States*: L'Abate 1960	**MIDDLE EAST** *Israel*: Chrysanthis 1946 **NORTH AMERICA** *Canada*: Nielsen et al. 1999 (13-16 year olds); *United States*: Foulkes et al. 1974* (11-12 year olds); Foulkes et al. 1978*(13-14 years olds); M Howard 1978 (dream recall); Domino 1982; Winegar & Levin 1997 (dream recall); Avila-White et al. 1999:166 (dream recall)	**EUROPE** *Germany*: Wynaendts-Francken 1907; Heerwagen 1989; Schredl & Montasser 1996 (19-35 year olds); Schredl & Montasser 1997; Schredl 2000; Schredl 2002; Schredl 2003; Schredl & Piel 2003 (18-60+ year olds); Schredl & Piel 2005 (18-60+ year olds) **NORTH AMERICA** *Canada*: Nielsen et al. 2003 (college)	**NORTH AMERICA** *United States*: Giambra et al. 1979 (17-92 year olds); Giambra et al. 1996 (17-92 year olds)

5.5.2.2. Dream Content: Aggression Themes

The available research on sex differences in the content of recalled dreams involving aggression has generally concluded that a greater proportion of the dreams by males have such content than do those by females (Table 5.5.2.2).

Table 5.5.2.2. Dream content: Aggression themes.

Nature of Any Difference					Postpubertal	
					Adolescent	Adult
Males more					**NORTH AMERICA** *United States*: Avila-White et al. 1999:168	**ASIA** *Japan*: Griffith et al. 1958* **EUROPE** *Germany*: Schredl et al. 2003 (young); Schredl et al. 2004 (college) **NORTH AMERICA** *United States*: Griffith et al. 1958*; CS Hall & Domhoff 1963b; CS Hall et al. 1982:192 (college); Krippner & Weinhold 2002
No signif. difference						
Females more					**AFRICA** *East African Tribes*: RL Munroe et al. 1985	**NORTH AMERICA** *United States*: CS Hall 1964 (young, violence victimization)

5.5.2.3. Dream Content: Flying

A couple of studies found that males were more likely than females to recall dreams in which they were flying (Table 5.5.2.3).

Table 5.5.2.3. Dream content: Flying.

Nature of Any Difference					Postpubertal	
						Adult
Males more						**NORTH AMERICA** *Canada*: Zadra & Nielson 1997 (college); Qadra & Nielson 1999 (college)
No signif. difference						
Females more						

5.5.2.4. Dream Content: Male Characters

Several studies have sought to determine if the dreams people have are more likely to contain male or female characters. As shown in Table 5.5.2.4, nearly all of these studies have concluded that male characters are more common in the dreams of both sexes, particularly in the case of male dreamers.

Table 5.5.2.4. Dream content: Male characters.

Nature of Any Difference					Postpubertal		Multiple Age Categories
					Adolescent	Adult	
Male characters more frequent					**AFRICA** *Uganda*: Robbins & Kilbride 1971* (by males) **NORTH AMERICA** *United States*: Avila-White et al. 1999:167 (by both sexes)	**ASIA** *India*: Grey & Kalschad 1971* (by males) **EUROPE** *Britain*: RJ Berger 1963*(by males) **EUROPE** *Germany*: Schredl & Jacob 1998 (young, by both sexes); Schredl et al. 2003 (college, by both sexes) **NORTH AMERICA** *Canada*: Kramer et al. 1983* (by both sexes); *United States*: CS Hall & Domhoff 1963a* (college, by both sexes); Foulkes & Rechtschaffen 1964 (by both sexes); CS Hall & Van de Castle 1966a (college, by both sexes); CS Hall et al. 1982:192 (college, by both sexes); Kramer et al. 1983* (college, by both sexes); Domhoff 1996 (by both sexes)	**NORTH AMERICA** *United States*: RJ Berger 1963* (by both sexes); Brenneis 1970 (by both sexes); CS Hall 1984 (by both sexes); CS Hall & Domhoff 1963a* (by both sexes)
No signif. difference						**NORTH AMERICA** *United States*: Rubinstein & Krippner 1991 (by both sexes); Krippner & Weinhold 2002 (by both sexes)	**LATIN AMERICA** *Peru*: Urbina & Grey 1975 (by both sexes)
Female characters more frequent					**AFRICA** *Uganda*: Robbins & Kilbride 1971* (by females)	**ASIA** *India*: Grey & Kalschad 1971* (by females) **EUROPE** *Britain*: RJ Berger 1963*(by females)	

5.5.2.5. Dream Content: Physical Objects and Artifacts Other Than Clothing

A substantial gender difference in the types of physical objects and artifacts dreamt about has been documented. Males report dreaming more about tools, machines, and weapons (Table 5.5.2.5).

Table 5.5.2.5. Dream content: Physical objects and artifacts other than clothing.

Nature of Any Difference					Postpubertal		Multiple Age Categories
					Adolescent	Adult	
Males more					**NORTH AMERICA** *United States*: CS Hall & Van de Castle 1966a* (tools & machines)	**ASIA** *Japan*: Griffith et al. 1958* (finding money) **EUROPE** *Germany*: Schredl et al. 2004 (college) **NORTH AMERICA** *United States*: Griffith et al. 1958* (finding money); Ward et al. 1961 (among psychiatric patient); CS Hall & Van de Castle 1966a* (tools & machines); CS Hall et al. 1982:192* (college, outdoor settings & weapons & implements); Krippner & Weinhold 2002* (tools & machines)	**AFRICA** *Tribal Societies*: Colby 1963* (weapons); RL Munroe et al. 1985* (East Africa, weapons) **EUROPE** *Germany*: Schredl & Piel 2005 (18-60+ year olds)
No signif. difference							
Females more							

5.5.2.6. Dream Content: Clothing

Females report dreaming more about clothing than do males according to the available research (Table 5.5.2.6).

Table 5.5.2.6. Dream content: Clothing.

Nature of Any Difference					Postpubertal		Multiple Age Categories
					Adolescent	Adult	
Males more							
No signif. difference							
Females more					**NORTH AMERICA** *United States*: CS Hall & Van de Castle 1966a*	**NORTH AMERICA** *United States*: CS Hall & Van de Castle 1966a*; CS Hall et al. 1982:192* (college); Krippner & Weinhold 2002*	**AFRICA** *Tribal Societies*: Colby 1963*; RL Munroe et al. 1985* (East Africa)

5.5.2.7. Dream Content: Sexual Themes

All of a limited number of studies have concluded that males report having more dreams with sexual themes than is the case for females (Table 5.5.2.7).

Table 5.5.2.7. Dream content: Sexual themes.

Nature of Any Difference					Postpubertal		Multiple Age Categories
					Adolescent	Adult	
Males more					**NORTH AMERICA** *United States*: CS Hall & Van de Castle 1966a*	**ASIA** *Japan*: Griffith et al. 1958* **EUROPE** *Germany*: Schredl et al. 2003 (young); Schredl et al. 2004 (college) **NORTH AMERICA** *Canada*: Nielsen et al. 2003 (college); *United States*: Griffith et al. 1958*; CS Hall & Van de Castle 1966a*; Hall et al. 1982 (college)	**EUROPE** *Germany*: Schredl et al. 1998 (13-83 year olds) **NORTH AMERICA** *United States*: Giambra et al. 1979 (17-92 year olds) **INTERNATIONAL** *Tribal Societies*: Colby 1963
No signif. difference							
Females more							

5.5.2.8. Dream Content: Social Themes Other Than Aggression

Findings regarding the content of dreams with themes other than those of violence and aggression are shown in Table 5.5.2.8. Overall, the table suggests that male dreams more often have competitive and achieving themes and female dreams more commonly have themes about the family.

Table 5.5.2.8. Dream content: Social themes other than aggression.

Nature of Any Dif-ference					Postpubertal		Multiple Age Categories
					Adolescent	Adult	
Males more						**NORTH AMERICA** *United States*: CS Hall et al. 1982* (young, competition & achieving in public arena)	
No signif. difference						**NORTH AMERICA** *Canada*: Kramer et al. 1983 (young); Lortie-Lussier et al. 1992; *United States*: Rubinstein & Krippner 1991; Krippner & Weinhold 2002 (about relatives)	
Females more					**NORTH AMERICA** *United States*: Schubert & Wagner 1936 (of home & family); Avila-White et al. 1999:168 (friendly themes)	**NORTH AMERICA** *United States*: CS Hall & Domhoff 1964 (friendly themes); CS Hall & Van de Castle 1965:26 (college, weddings & babies); CS Hall et al. 1982* (home & family)	**INTERNATIONAL** *Tribal Societies*: Colby 1963 (family members) **NORTH AMERICA** *United States*: Cason 1935:51 (of home & family, 8 to 20 years old)

5.5.2.9. Other Aspects of Dream Content

Among other aspects of sex differences in dreaming that researchers have investigated are those listed in Table 5.5.2.9. These studies suggest that males are more likely than females to dream in the third person (as though a story is being told) and they are more likely to dream about death. Females, on the other hand, recall dreams that are experienced in the first person more.

Table 5.5.2.9. Other aspects of dream content.

Nature of Any Dif-ference					Postpubertal		Multiple Age Categories
						Adult	
Males more							**AFRICA** *Tribal Societies*: Colby 1963 (death) **NORTH AMERICA** *United States*: Soper et al. 1994 (3rd person dreaming)
No signif. difference						**NORTH AMERICA** *Canada*: Zadra et al. 1998* (auditory sensations, gustatory sensations)	
Females more						**NORTH AMERICA** *Canada*: Zadra et al. 1998* (olfactory sensations)	**EUROPE** *Germany*: Schredl & Piel 2005 (death) **NORTH AMERICA** *United States*: Soper et al. 1994 (1st person dreaming)

5.5.2.10. Fantasizing in General

Two studies investigated fantasizing in general. Both concluded that females do so more than males (Table 5.5.2.10).

Table 5.5.2.10. Fantasizing in general.

Nature of Any Dif-ference	Prepubertal				Postpubertal		
				Childhood		Adult	
Males more							
No signif. diff.							
Females more				**NORTH AMERICA** *United States*: L'Abate 1960		**EUROPE** *Netherlands*: Evers et al. 2005:263	

5.5.2.11. Fantasizing About Sexuality

Which sex fantasizes about sex the most? Table 5.5.2.11 suggests that the answer is males, although with two exceptions. One exception is in regard to same-sex fantasies and the other has to do with fantasies of sexuality within a committed relationship.

Table 5.5.2.11. Fantasizing about sexuality.

Nature of Any Dif-ference					Postpubertal		Multiple Age Categories
					Adolescent	Adult	
Males more					**EUROPE** *Spain*: Navarro-Pertusa et al. 2003	**ASIA** *China*: Tang et al. 1997:84 (college); *Japan*: Griffith et al. 1958 (college) **EUROPE** *Britain*: Eysenck 1971; *Netherlands*: Vanwesenbeck et al. 1998 (college); *Germany*: Schredl et al. 2003 (college) **MIDDLE EAST** *Israel*: Knafo & Jaffe 1984 (college) **NORTH AMERICA** *Canada*: Meston et al. 1996 (young); *United States*: Rainwater 1966 (married couples); Pfeiffer 1969 (elderly); Pfeiffer et al. 1972; JL Carroll et al. 1985 (college, unmarried); ES Person et al. 1989 (young); BJ Ellis & Symons 1990* (college, numerous sex partners); Buss & Schmitt 1993 (college); Hsu et al. 1994 (young); Laumann et al. 1994; Mosher & Maclan 1994:108 (college); Byers et al. 1998 (college); S Davies et al. 1999 (college, long-term dating couples); A Walsh & Walsh 2002:214 (college)	**EUROPE** *Britain*: GD Wilson 1997 **NORTH AMERICA** *United States*: Clark & Hatfield 1989
No signif. difference							
Females more					**NORTH AMERICA** *United States*: Remafedi et al. 1992:717 (same-sex fantasies)	**NORTH AMERICA** *United States*: Pryzbyla et al. 1983 (in a committed relationship); BJ Ellis & Symons 1990* (college, in a committed relationship)	

5.5.2.12. Fantasizing About Violence

Pleasurable thinking about and rehearsing aggression and violence is often deduced from observing young children playing along with toys. Another method used with children and adults has involved asking them to tell stories of interest to them to researchers. The degree to which these activities have aggressive or violent elements has been compared for males and females. Table 5.5.2.12 shows that all of the findings from these comparisons have concluded that males take greater pleasure and interest in contemplating or fantasizing about violent activities.

Table 5.5.2.12. Fantasizing about violence.

Nature of Any Dif-ference	Prepubertal				Postpubertal		
			Early Childhood	Childhood		Adult	
Males more			**EUROPE** *Britain*: PK Smith 1977 **NORTH AMERICA** *United States*: McLoyd 1980; Morey 1981; D Cole & LaVoie 1985	**NORTH AMERICA** *United States*: BG Rosenberg & Sutton-Smith 1959; J Singer 1973; Paley 1984		**NORTH AMERICA** *United States*: Kenrick & Sheets 1993 (college)	
No signif. diff.							
Females more							

5.6
OTHER ASPECTS OF COGNITION

Several additional aspects of cognition are considered in the following section with respect to possible gender differences.

5.6.1. Conceptualizing/Categorizing/Reasoning Abilities and Strategies

Sex differences in one's ability or tendency to conceptualize or categorize cover numerous topics, ranging from color discrimination to attributions to the motives of others.

5.6.1.1. Conceptualizing/Recognizing Genetic Relatedness

One study sought to determine if a sex difference could be detected in the ability to match photographs of people based on the degree to which they were genetically related. No significant difference was found (Table 5.6.1.1).

Table 5.6.1.1. Conceptualizing/recognizing genetic relatedness.

Nature of Any Difference					Postpubertal	
						Adult
Males more						
No signif. difference						**NORTH AMERICA** *United States*: Nesse et al. 1990 (college)
Females more						

5.6.1.2. Attribution of Sexual Meaning/Motivation to Heterosexual Interactions

Under a wide range of social circumstances, males have been found to attribute sexual meaning or motivation to the interactions they have with members of the opposite sex more than do females (Table 5.6.1.2).

Table 5.6.1.2. Attribution of sexual meaning/motivation to heterosexual interactions.

Nature of Any Difference					Postpubertal	
						Adult
Males more						**NORTH AMERICA** *United States*: Abbey 1982 (young); Major & Heslin 1982 (young); Goodchilds & Zellman 1984 (young); Abbey & Melby 1986 (young); Abbey et al. 1987 (young); Shotland & Craig 1988 (college); Sigal et al. 1988; Saal et al. 1989 (young); Kowalski 1993 (young)
No signif. difference						
Females more						

5.6.1.3. Conceptualizing What Constitutes Sexual Harassment

Several studies have compared the assessments of males and females regarding the types of behavior they would consider sexual harassment. In all cases, females were found to include a greater range of behavior as constituting sexual harassment than did males (Table 5.6.1.3).

Table 5.6.1.3. Conceptualizing what constitutes sexual harassment.

Nature of Any Difference					Postpubertal	
						Adult
Males more inclusive						
No signif. difference						
Females more inclusive						**NORTH AMERICA** *United States*: Gutek & Morasch 1982; Gutek et al. 1983; Kenig & Ryan 1986 (college); GN Powell 1986; T Jones et al. 1987; JB Pryor & Day 1988 (young); S Ellis et al. 1991 (young); Bursik 1992 (young); TS Jones & Remland 1992 (young); Popovich et al. 1992 (young); MS Marks & Nelson 1993 (college); MS Stockdale 1993 (young); Tata 1993 (young); Baird et al. 1995; LaRocca & Kromrey 1999 (young); Wiener & Hurt 2000

5.6.1.4. Judgment Regarding the Seriousness of Sexual Harassment

One study concluded that women considered sexual harassment to be a more serious infringement upon an individual's integrity and right to privacy than did men (Table 5.6.1.4).

Table 5.6.1.4. Judgment regarding the seriousness of sexual harassment.

Nature of Any Difference					Postpubertal	
						Adult
Males more						
No signif. difference						
Females more						**NORTH AMERICA** *United States*: EG Collins & Blodgett 1981

5.6.1.5. Awareness of Obesity in Others

A few studies have reported that females report being more aware of obesity in others with whom they interact to a greater degree than males (Table 5.6.1.5).

Table 5.6.1.5. Awareness of obesity in others.

Nature of Any Difference	Prepubertal	Postpubertal
	Childhood	Adolescent
Males more		
No signif. difference		
Females more	**NORTH AMERICA** *United States*: Lerner & Gellert 1969	**EUROPE** *Britain*: Worsley 1981a; Worsley 1981b **NORTH AMERICA** *United States*: Harris & Smith 1982

5.6.1.6. Awareness of One's Disabilities

No consistent sex differences have been reported regarding awareness of one's disabilities (Table 5.6.1.6).

Table 5.6.1.6. Awareness of one's disabilities.

Nature of Any Difference	Postpubertal
	Adult
Males more	**NORTH AMERICA** *United States*: Fuhrer et al. 1992
No signif. difference	**NORTH AMERICA** *United States*: Krause 1998
Females more	**NORTH AMERICA** *United States*: Woodrich & Patterson 1983

5.6.1.7. Awareness of Suicidal Thinking by Others

One study concluded that females were more likely to be aware of someone they knew having disclosed to them that they were contemplating suicide (Table 5.6.1.7).

Table 5.6.1.7. Awareness of suicidal thinking by others

Nature of Any Difference	Postpubertal
	Adolescent
Males more	
No signif. difference	
Females more	**NORTH AMERICA** *United States*: Overholser et al. 1989:927

5.6.1.8. Color Naming Speed

Several studies have compared the sexes in terms of their abilities to accurately name colors. In all cases, and for a considerable range of ages, females were faster and more accurate than males (Table 5.6.1.8).

Table 5.6.1.8. Color naming speed.

Nature of Any Difference	Prepubertal			Postpubertal
	Toddler	Early Childhood	Childhood	Adult
Males faster & more accurate				
No signif. difference				
Females faster & more accurate	**NORTH AMERICA** *United States*: R Staples 1932	**NORTH AMERICA** *United States*: Bornstein 1985	**NORTH AMERICA** *United States*: Denckla & Rudel 1974	**NORTH AMERICA** *Canada*: Kimura et al. 1996 (young); Saucier et al. 2001 (young); *United States*: Woodworth & Wells 1911 (young); Ligon 1932; JR Stroop 1935 (young); PH Dubois 1939 (young)

5.6.1.9. Stroop Color-Word Test

The Stroop color-word naming test involves asking subjects to look at a series of pictures in which words for various colors are written in colors that are inconsistent with the color's names. For example, the word *green* might be printed in the color red. Subjects are instructed to tell the researcher the color in which the words are printed, not what the word states in the way of a color.

As shown in Table 5.6.1.9, several studies have investigated gender difference in the ability of subjects to maintain their focus on the color rather than the name of the color. The results have been inconsistent with respect to any sex difference.

Table 5.6.1.9. Stroop Color-Word Test.

Nature of Any Difference	Prepubertal	Postpubertal	
	Childhood	Adolescent	Adult
Males more			**NORTH AMERICA** *United States*: Owens & Broida 1998
No signif. difference	**NORTH AMERICA** *United States*: D Daniel et al. 2000*	**NORTH AMERICA** *United States*: Peretti 1969	**NORTH AMERICA** *United States*: J Stroop 1935 (college); D Daniel et al. 2000*
Females more		**NORTH AMERICA** *United States*: Goldon 1978*	**NORTH AMERICA** *United States*: Ligon 1932 (young); Stroop 1935 (young); Peretti 1971 (young); Goldon 1978*; Strickland et al. 1997 (Blacks) **OCEANIA** *Hawaii*: Golden 1974 (young)

5.6.1.10. Decoding/Interpreting Facial Expressions

The available research on people's abilities to decode (or correctly interpret) the facial expressions of others have come to different conclusions regarding the possibility of any sex differences (Table 5.6.1.10).

Table 5.6.1.10. Decoding/interpreting facial expressions.

Nature of Any Difference	Postpubertal
	Adult
Males more accurate	**NORTH AMERICA** *United States*: Toner & Gates 1985 (angry expressions); HL Wagner et al. 1986 (angry expressions); Rotter & Rotter 1988 (angry expressions)
No signif. difference	**EUROPE** *Britain*: H Wagner et al. 1986 **NORTH AMERICA** *United States*: R Buck et al. 1972; RW Buck 1974; Fujita et al. 1980*(posed expressions); Wagner et al. 1986; Wagner et al. 1993 (angry expressions)
Females more accurate	**NORTH AMERICA** *United States*: Fujita et al. 1980*(spontaneous expressions); Larkin et al. 2002 (decode expressions of disgust)

5.6.2. Thought and Recall Focus

A few studies have been directed toward determining if males and females differ regarding the focus of their thoughts and their recall. Findings are summarized below.

5.6.2.1. Focusing One's Thoughts on Mastery of Physical Things and Activities

All of three studies on sex differences in how much time is spent contemplating how to achieve mastery of physical objects and activities (as opposed to social activities) have concluded that such thoughts are more common among males than among females (Table 5.6.2.1).

Table 5.6.2.1. Focusing one's thoughts on mastery of physical things and activities.

Nature of Any Difference	Postpubertal	Multiple Age Categories
	Adolescent	
Males more	**NORTH AMERICA** *United States*: Stapley & Haviland 1989	**NORTH AMERICA** *United States*: Tannen 1994a; Tannen 1994b
No signif. difference		
Females more		

5.6.2.2. Focusing One's Thoughts and Recall on Social Relationships

The available evidence concerning which sex is more likely to contemplate social experiences and past relationships have all concluded that this is more typical of females than of males (Table 5.6.2.2).

Table 5.6.2.2. Focusing one's thought and recall on social relationships.

Nature of Any Dif-ference	Postpubertal	Multiple Age Categories
	Adult	
More in males		
No signif. difference		
More in females	**NORTH AMERICA** *United States*: Adock & Ross 1983 (young); Cowan & Davidson 1984 (young); Schwartz 1984 (young)	**NORTH AMERICA** *United States*: Belenky et al. 1986; Oyserman & Markus 1993; Thorne 1995

5.7
SELF-REFLECTION AND SELF-ASSESSMENT

Self-assessment is a valuable and frequently used source of information, especially in the health and social/behavioral sciences. In the following tables, the results of studies of sex differences in self-assessed well-being and in physical and behavioral traits are reviewed.

5.7.1. Self-Reflection

Many aspects of self-reflection have been examined with regard to average gender differences. Findings from these studies are reviewed below.

5.7.1.1. Self-Consciousness

Several studies have sought to determine if a sex difference exists in self-consciousness. Basically, this means the degree to which someone thinks often about themselves, either directly or in connection with others. Most studies indicate that females are more self-conscious than males except in adulthood when results are mixed (Table 5.7.1.1).

Table 5.7.1.1. Self-consciousness.

Nature of Any Difference	Prepubertal	Postpubertal	
	Early Childhood	Adolescent	Adult
Males more			**MIDDLE EAST** *Saudi Arabia*: Bendania & Abed 1997 (public & private self-consciousness) **NORTH AMERICA** *Canada*: KM Cramer 2000 (college)
No signif. difference			**EUROPE** *Sweden*: Lindwall 2004:237 (college, self-reflection, internal state awareness, public self-consciousness) **NORTH AMERICA** *United States*: Fenigstein et al. 1975
Females more	**NORTH AMERICA** *United States*: RR Sears et al. 1957	**NORTH AMERICA** *United States*: BD Porteus & Johnson 1965; F Rosenberg & Simmons 1975; JP Hill & Lynch 1983; Allgood-Merten et al. 1990	**EUROPE** *Sweden*: Nystedt & Smari 1989 (public self-consciousness) **LATIN AMERICA** *Brazil*: Texeira & Gomes 1995 (public & private self-consciousness) **NORTH AMERICA** *Canada*: PAR Csank & Conway 2004 (college, self-reflection); *United States*: Rempel & Signoi 1964 (college, R)

5.7.1.2. Being Introspective

One study concluded that females were more inclined than males to be introspective (Table 5.7.1.2).

Table 5.7.1.2. Being introspective.

Nature of Any Difference	Postpubertal
	Adult
Males more	
No signif. difference	
Females more	**NORTH AMERICA** *United States*: Kenney & White 1966 (White elementary school teachers)

5.7.1.3. Ego Development

The concept of an ego has to do with how firmly one holds to a strong sense of self. Two studies of sex differences in the development of ego strength both concluded that it was greater in females than in males (Table 5.7.1.3).

Table 5.7.1.3. Ego development.

Nature of Any Difference	Postpubertal	
	Adolescent	Adult
Males more		
No signif. difference		
Females more	**NORTH AMERICA** *Canada*: Gfellner 1986a	**NORTH AMERICA** *United States*: Redmore 1983 (college)

5.7.1.4. Meaning of Life Scale

A scale for assessing how much purpose people see to their life was developed primarily for persons who are in considerable ill health. As shown in Table 5.7.1.4, studies of sex differences in this scale have concluded that females score higher than males.

Table 5.7.1.4. Meaning of life scale.

Nature of Any Difference	Postpubertal	Multiple Age Categories
	Adult	
Males higher		
No signif. difference		
Females higher	**NORTH AMERICA** *United States*: Van deCreek 1991; Fry 2001 (elderly)	**NORTH AMERICA** *Canada*: GT Recker 1992

5.7.1.5. Internally Oriented Assessment of Self-Worth

The available research has concluded that males are more internally oriented in assessing their self-worth while females seem to assess their self-worth in terms of their perceptions by others (Table 5.7.1.5).

Table 5.7.1.5. Internally oriented assessment of self-worth.

Nature of Any Difference	Postpubertal
	Adult
Males more	**NORTH AMERICA** *United States*: DC Jack & Dill 1992; Roberts & Nalen-Hoeksema 1994
No signif. difference	
Females more	

5.7.1.6. Self-Concept/Self-Image

Nearly all studies have found that on average males report having a more positive self-concept than do females (Table 5.7.1.6).

Table 5.7.1.6. Self concept/self image.

Nature of Any Dif-ference	Prepubertal	Postpubertal		Multiple Age Categories
	Childhood	Adolescent	Adult	
Males more positive	**NORTH AMERICA** *United States*: PS Sears 1964 **OCEANIA** *Australia*: ID Smith 1975	**ASIA** *China*: Cheng & Watkins 2000 **NORTH AMERICA** *Canada*: Hakstian & Cattell 1975:307 (ego-strength); *United States*: FR Rosenberg & Simmons 1975; Simmons & Blyth 1987; Brooks-Gunn 1988; S Harter 1988; Rierdan et al. 1989; Nell & Ashton 1996 **OCEANIA** *Australia*: H Marsh 1989; J O'Dea & S Abraham 1999a	**ASIA** *Hong Kong*: C Davis & Katzman 1997 (college); *Japan*: Kowner 2002 (college) **NORTH AMERICA** *United States*: McKee & Sherriffs 1957 (young); McKee & Sherriffs 1959 (young); Rosenkrantz et al. 1968 (young); Baruch 1973 (young); Franzoi & Herzog 1987 (college); Akan & Grilo 1995 (college)	**NORTH AMERICA** *United States*: Lenney 1977
No signif. difference	**NORTH AMERICA** *United States*: Buckner & Fivush 1998		**NORTH AMERICA** *United States*: Mackie 1983 (college)	
Females more positive				

5.7.1.7. Self-Confidence/Self-Assuredness

Persons who are self-assured or self-confident have a relatively high degree of certainty that they are making the correct decisions. Most attempts to measure self-assuredness do so using self-reports, except in the case of young children for whom parental or teacher ratings are often used. As shown in Table 5.7.1.7, the evidence is unanimous in indicating that males are more self-assured than are females.

Table 5.7.1.7. Self-confidence/self-assuredness.

Nature of Any Difference	Prepubertal				Postpubertal		Multiple Age Categories
			Pre-School		Adolescent	Adult	
Males more			**NORTH AMERICA** *United States*: EJ Day 1932		**EUROPE** *Britain*: Ellwood & Comber 1996 (teacher rated self-confidence)	**EUROPE** *Britain*: Summerfield & Youngman 1999 (college, regarding their academic performance); *Croatia*: Marusic et al. 1995 (college) **MIDDLE EAST** *Israel*: Carmel & Bernstein 2003:123 (elderly; self perceived) **NORTH AMERICA** *Canada*: Wardell & Yeudall 1980:163 (young); *United States*: Brim et al. 1963; NT Feather 1969b (self-confidence); S Beyer 1990 (young, performing "masculine" business tasks); Webster & Ellis 1996 (financial planning & analysis); S Beyer & Bowden 1997 (young); E Goldsmith & Goldsmith 1997 (college); JT Spence & Buckner 2000:49 (self-report)	**NORTH AMERICA** *United States*: EK Strong 1943 (self-confidence)
No signif. difference							
Females more							

5.7.1.8. Self-Esteem

A very large number of studies have been undertaken to determine if the sexes differ regarding self-esteem. The findings have been very much in conflict. In the case of children, Split-Table 5.7.1.8a shows that most studies have found no significant sex difference, but when findings are significant, most studies suggest that boys have higher self-esteem than do girls.

Split-Table 5.7.1.8a. Self-esteem (prepubertals).

Nature of Any Difference	Prepubertal			
				Childhood
Males higher				**EUROPE** *Britain*: Eiser et al. 1995:430; *Portugal*: G Calhoun et al. 1978 **NORTH AMERICA** *Canada*: Battle 1977a; *United States*: DE Bush et al. 1978; Seidner 1978; Simmons et al. 1978; Elrod & Crase 1980:726; Scruggs & Mastropieri 1983; BK Mendelson & White 1985 (over-weight); WM Reynolds et al. 1985; Nottelmann 1987; Alpert-Gillis & Connell 1989 (older); Allgood-Merten & Stockard 1991; AC Israel & Ivanova 2002:426 (over-weight); Pomerantz et al. 2002:400 (self-worth); TF Locke & Newcomb 2003:55; J Frost & McKelvie 2004
No signif. difference				**ASIA** *China*: Stigler et al. 1985 **LATAN AMERICA** *Mexico*: G Calhoun et al. 1978* **NORTH AMERICA** *Canada*: Pawelkiewicz & McIntire 1975; Battle 1976; *United States*: Drummond et al. 1977; Piers 1977; Shiffler et al. 1977; C Ames 1978; G Calhoun et al. 1978*; Prawat et al. 1979a; C Ames & Felker 1979; GC Roberts et al. 1981; Karnes & Wherry 1981; Harter 1982; BW Johnson et al. 1983; Kugle et al. 1983; HW Marsh et al. 1984; JR Wallace et al. 1984; Kaslow et al. 1984; Kawash et al. 1984; Wiehe 1984; Blechman et al. 1986; Nottlemann & Welsh 1986; Chiu 1987; Rotheram 1987; Dubow & Cappos 1988; L Gates et al. 1988; LK Chan 1988; Kohr et al. 1988* (middle SES background); Boivin & Begin 1989; HW Marsh 1989; Chiu 1990; Patterson et al. 1990; Pliner et al. 1990; BJ Hirsch & Dubois 1991; DA Cole 1991a; HW Marsh et al. 1991 **OCEANIA** *Australia*: MC Lawson 1980; Craske 1988 **INTERNATIONAL** *Multiple Countries*: G Calhoun & Sethi 1987
Females higher				**ASIA** *China*: D Watkins et al. 1997 **NORTH AMERICA** *United States*: Pallas et al. 1990

Findings concerning adolescents and adults appear in Split-Table 5.7.1.8b. It shows that following puberty, considerably more studies have concluded that males surpass females in self-esteem, although several studies suggesting the contrary have also been published along with numerous studies indicating no significant differences.

The failure to reach a clear conclusion regarding sex differences in self-esteem is reflected in prior attempts to generalize. The literature review by Maccoby and Jacklin (1974) concluded that no discernable sex difference could be identifiable, while a meta-analysis by Whitley (1983) brought the author to assert that males had higher self-esteem than females. A more recent meta-analysis by Sahlstein and Allen

(2001:64) reached the opposite conclusion. The present vote-counting meta-analysis suggests that no generalization is warranted at this time. It may be wise for researchers in this field to examine their operational definitions of self-esteem carefully.

Split-Table 5.7.1.8b. Self-esteem, postpubertals.

Nature of Any Difference	Postpubertal		Multiple Age Categories
	Adolescent	Adult	
Males higher	**ASIA** *Hong Kong*: Lau & Leung 1992; *Japan*: RM Lerner et al. 1980; Takakura & Sakihara 2001 **EUROPE** *Britain*: Foon 1988; Furnham & Cheng 2000; *Germany*: Kirkcaldy et al. 2003:54; *Netherlands*: Verkuyten 1986 **NORTH AMERICA** *Canada*: Avison & McAlpine 1992; Marcotte 2002; *United States*: Bohan 1973; FR Rosenberg & Simmons 1975; RG Simmons & Rosenberg 1975; Prescott 1978; Lamke 1982; Tobin-Richard et al. 1984; CL Richman et al. 1985b; Brack et al. 1988; Allgood-Merten et al. 1990; TJ Wade 1991; Block & Robins 1993*; Brown & Gilligan 1993; Orr & Ben-Eliahu 1993; Dukes & Martinez 1994; Sadker & Sadker 1994; Bolognini et al. 1996; Chubb et al. 1997; Durm et al. 1997; DuBois et al. 1998; M Knox et al. 1998; Polce-Lynch et al. 1998; SD Hayes et al. 1999; Tiggemann & Williamson 2000; Polce-Lynch et al. 2001; Burrow et al. 2004:277 (adoptees); J Frost & McKelvie 2004 **OCEANIA** *Australia*: Antill & Cunningham 1980; Feather 1985; Fletcher & Hattie 2005:663	**EUROPE** *Denmark*: Weinland et al. 1976 (young); *Britain*: D Cramer 1987 (young); Geruai et al. 1995* (married couples); *Hungary*: Geruai et al. 1995* (married couples) **MIDDLE EAST** *Israel*: Lobel & Agami-Rozenblat 1993 (young); Carmel & Bernstein 2003:123 (elderly) **NORTH AMERICA** *Canada*: Battle 1977b (young); R Cowan et al. 1978 (young); V Walters et al. 2002:683 (excluding elderly); *United States*: Mathers & Kahn 1975; Hoelter 1983 (young); J Fleming & Countey 1984; B Major et al. 1984c; Marron & Kayson 1984 (college); KE O'Grady 1989; Joubert 1991 (young); E O'Brien 1991 (college); Block & Robins 1993* (young); Hong et al. 1993 (college); Feingold 1994:429; Raymore et al. 1994; Nell & Ashton 1996 (college); SD Hayes et al. 1999 (college); Mellanby et al. 2000:384; J Frost & McKelvie 2004* (college) **OCEANIA** *Australia*: Gurney 1980 (h.s. drop-outs); Heaven 1993:70 (young)	**EUROPE** *Britain*: Gervai et al. 1995:121*; *Hungary*: Gervai et al. 1995:121*; **NORTH AMERICA** *Canada*: Frost & McKelvie 2004*
No signif. difference	**AFRICA** *Ghana*: Alawyie & Alawyie 1988 **ASIA** *China*: D Watkins et al. 1997; *India*: Rao 1978; Sethi & Calhoun 1986 **EUROPE** *Britain*: Eiser et al. 1995a:311 (young); *Finland*: Keltikangos-Jarvinen 1992 **LATIN AMERICA** *Caribbean*: AG Richardson 1987 **MIDDLE EAST** Abu-Saad 1999:483 **NORTH AMERICA** *United States*: Prawat et al. 1979b; Lerner et al. 1981 (older); WL Osborne & LeGette 1982; HM Marsh et al. 1985a; Workman & Beer 1989; S Williams & McGee 1991; Mullis et al. 1992 **OCEANIA** *Australia*: RB Smith et al. 1973; *Malaysia*: Noor et al. 2003:240 (college)	**ASIA** *China*: Watkins & Yu 1993:35 (college) **NORTH AMERICA** *United States*: Pugliesi 1995:63; R Ryckman & Sherman 1973; R Larson 1978 (elderly); Spence & Helmreich 1978; Antonucci & Akiyama 1987 (elderly); RA Josephs et al. 1992:395 (college); Mutran et al. 1997:S93 (ages 58-64, employed)	
Females higher	**NORTH AMERICA** *United States*: JT Spence et al. 1975; Whiteside 1976; Kohr et al. 1988; Cienki & Brooks 1989	**EUROPE** *Britain*: McFarquhar & Lowis 2000 (patrons of a hair salon) **NORTH AMERICA** *United States*: Prescott 1978 (young); G Calhoun et al. 1988 (young); Kohr et al. 1988* (young, lower SES)	

5.7.1.9. Self-Esteem/Self-Image Affected by Social Evaluations/Looking Glass Self

One study indicated that the self-esteem of females is affected more than that of males by social evaluations that are offered (such as in work evaluations; Table 5.7.1.9).

Table 5.7.1.9. Self-esteem/self image affected by social evaluations.

Nature of Any Difference				Postpubertal	
				Adolescent	Adult
Males more					
No signif. difference					
Females more				**NORTH AMERICA** *United States*: R Carlson 1965; Dusek & Flaherty 1981; WJ McGuire & McGuire 1982	**NORTH AMERICA** *United States*: M Johnson & VS Helgeson 2002

5.7.1.10. Lipsitt Self-Concept Scale

The Lipsitt self-concept scale is basically designed to assess how well children and adolescents think of themselves and their relationships with others. As shown in Table 5.7.1.10, the evidence is somewhat mixed, but generally suggests that females score higher in their self-concepts than is the case for males.

Table 5.7.1.10. Lipsitt self-concept scale.

Nature of Any Dif-ference	Prepubertal				Postpubertal	
				Childhood	Adolescent	
Males score higher						
No signif. difference				**NORTH AMERICA** *United States*: LP Lipsitt 1958; CL Mayer 1966; Krieger 1970		
Females score higher				**NORTH AMERICA** *United States*: Bledsoe 1964; AB Fields 1981 (low-income)	**EUROPE** *Britain*: LJ Francis et al. 1995:622 **NORTH AMERICA** *United States*: Reese 1961; Barnes & Farrier 1985 (low-income)	

5.7.1.11. Using Social Relationships for Defining Oneself

The limited evidence on sex differences in how people define or categorize themselves indicates that females are more likely than males to use nouns and adjectives that have to do with how they relate to others (e.g., mother, sister) rather than to how they operate on less social aspects of the world (e.g., scientist, conservationist) (Table 5.7.1.11).

Table 5.7.1.11. Using social relationships for defining oneself.

Nature of Any Dif-ference					Postpubertal	
						Adult
Males higher						
No signif. difference						
Females higher						**NORTH AMERICA** *United States*: Clancy & Dollinger 1993; Dollinger et al. 1996; Kashima et al. 2004

5.7.1.12. Self-Assessed Mental Health

The available studies of self-assessed mental health indicate that males rate it higher than is true for females, at least among adults, with the possible exception of the elderly (Table 5.7.1.12).

Table 5.7.1.12. Self-assessed mental health.

Nature of Any Dif-ference					Postpubertal	
						Adult
Males higher						**NORTH AMERICA** *United States*: Cleary et al. 2004:44* (ages 25-60); H Tabenkin et al. 2004
No signif. difference						**NORTH AMERICA** *United States*: Cleary et al. 2004:44* (ages 60-75)
Females higher						

5.7.2. Self-Assessed Physical Traits

Several physical traits or abilities have been assessed based on self-reports. The results are summarized below with respect to any sex differences.

5.7.2.1. Self-Assessed Athletic Ability/Coordination

A number of studies have assessed gender differences in self-assessed athletic ability. As shown in Table 5.7.2.1, most of these studies have concluded that males rate their athletic ability higher than do females, especially following the onset of puberty.

Table 5.7.2.1. Self-assessed athletic ability/coordination.

Nature of Any Dif-ference	Prepubertal				Postpubertal		
				Childhood	Adolescent	Adult	
Males higher				**ASIA** *China*: Stigler et al. 1985 **EUROPE** *Britain*: Eiser et al. 1995b:430 **NORTH AMERICA** *United States*: Harter 1982; HW Marsh et al. 1983; HW Marsh et al. 1984; HW Marsh et al. 1985b; Nottelmann 1987; LK Chan 1988; AM Lee et al. 1988; HW Marsh 1989; DA Cole 1991a; HW Marsh et al. 1991; Jacobs & Eccles 1992; Eccles et al. 1993; Wigfield et al. 1997; Jacobs et al. 2002:517 *	**NORTH AMERICA** *United States*: Jacobs et al. 2002:517* (more competent at sports)	**AFRICA** *Nigeria*: D Watkins & Akande 1992 (young) **MIDDLE EAST** *Turkey*: Asci 2002:368 (young) **NORTH AMERICA** *United States*: Hagborg 1993 (young); HW Marsh 1998 (young)	
No signif. difference				**EUROPE** *Britain*: Blechman et al. 1986; *Finland*: Suonpaa et al. 1989 **NORTH AMERICA** *United States*: Corbin et al. 1981; GC Roberts et al. 1981; Lee & Austin 1986; Nottelmann & Welsh 1986; TS Horn & Hasbrook 1987; Boivin & Begin 1989; Meyer et al. 1989; Vondra et al. 1989			
Females higher							

5.7.2.2. Self-Assessed Physical Attractiveness/Appearance (Body Image)

Most studies of self-assessed physical attractiveness have concluded that females provide higher ratings than do males (Table 5.7.2.2).

Table 5.7.2.2. Self-assessed physical attractiveness/appearance (body image).

Nature of Any Dif-ference					Postpubertal		
					Adolescent	Adult	
Males more						**ASIA** *China*: Tang et al. 1997:84 (college)	
No signif. difference							
Females more					**NORTH AMERICA** *United States*: J Coleman 1961; Douvan & Adelson 1966; WL Wallace 1966; Musa & Roach 1973; Eme et al. 1979	**MIDDLE EAST** *Turkey*: Asci 2002:368 (young) **NORTH AMERICA** *United States*: G Calden et al. 1959 (young); TM Miller et al. 1980 (young); A Downs 1990 (young)	

5.7.2.3. Criteria for Assessing Body Image

A few studies have sought to determine what criteria people use to assess the adequacy of their bodies. Regarding gender differences, these studies all indicate that males are more likely than females to make their assessments more on functional rather than on aesthetic terms (Table 5.7.2.3).

Table 5.7.2.3. Criteria for assessing body image.

Nature of Any Difference					Postpubertal		
			Early Childhood		Adolescent	Adult	
Males more functional rather than aesthetic terms			**NORTH AMERICA** *United States*: Story 1979		**NORTH AMERICA** *United States*: RM Lerner & Lerner 1977	**NORTH AMERICA** *United States*: RM Kurtz 1969	
No significant difference							
Females more functional rather than aesthetic terms							

5.7.2.4. Body Satisfaction

Especially following the onset of puberty, males have been found to express greater satisfaction with their bodily appearance than is the case for females (Table 5.7.2.4). This conclusion was also reached by Cohane & Pope (2001) based on a literature review.

Table 5.7.2.4. Body satisfaction.

Nature of Any Dif-ference	Prepubertal	Postpubertal		Multiple Age Categories
	Childhood	Adolescent	Adult	
Males higher	**NORTH AMERICA** *United States*: Mendelson & White 1985; Pallas et al. 1990	**EUROPE** *Germany*: Polce-Lynch et al. 1998*; *Sweden*: Thurfjell et al. 2004 **NORTH AMERICA** *Canada*: Marcotte 2002; *United States*: Douvan & Adelson 1966:46; Marsh 1989 (physical self concept); Shore & Porter 1990; Hattie 1992 (physical self concept); Tiggemann 1992; Polce-Lynch et al. 1998*; Hayes et al. 1999 (physical self concept); Tiggemann & Williamson 2000; TJ Wade 2000; Smolak et al. 2001; DT Barry & Grilo 2002:339	**EUROPE** *Britain*: Furnham et al. 2002c **MIDDLE EAST** *Israel*: Safir et al. 2005 (college) **NORTH AMERICA** *Canada*: Gupta et al. 1993; *United States*: Mickalide 1990; Hallinan et al. 1991; E O'Brien 1991; Beren et al. 1996; Nell & Ashton 1996 (college); Pingitore et al. 1997; McKinley 1998 (college); Hayes et al. 1999 (college); KJ Miller et al. 2000 (college); Lokken et al. 2003 (college) **OCEANIA** *Malaysia*: Noor et al. 2003:240 (college)	**OCEANIA** *Australia*: Tiggerman & Pennington 1990
No signif. difference				
Females higher	**NORTH AMERICA** *Canada*: Frost & McKelvie 2004			

5.7.2.5. Self-Assessed Facial Attractiveness

As with body satisfaction, males rate their faces as more attractive than do females, at least following the onset of puberty (Table 5.7.2.5). Interestingly, female faces in general are considered more attractive than male faces by both sexes (see Table 12.1.3.5).

Table 5.7.2.5. Self-assessed facial attractiveness.

Nature of Any Dif-ference	Postpubertal	
	Adolescent	Adult
Males more favorable	**NORTH AMERICA** *United States*: Douvan 1957; RM Smith 1963; F Rosenberg & Simmons 1975; Allgood-Merten et al. 1990 **INTERNATIONAL** *Multiple Countries*: Offer et al. 1988	**NORTH AMERICA** *United States*: LC Johnson 1956 (young); Cohn et al. 1987 (young); Hagborg 1993:144 (young)
No signif. difference		
Females more favorable		

5.7.2.6. Self-Assessed Being Over-Weight (Wanting to Lose Weight)

Studies among adolescents and adults have consistently found females wanting to lose weight more than males (Table 5.7.2.6.). It is worth noting that the clear-cut gender differences displayed in this table stand in contrast with results based on more objective measures such as the BMI, which shows mixed results regarding any difference in being overweight.

Table 5.7.2.6. Self-assessed being over-weight (wanting to lose weight).

Nature of Any Dif-ference	Postpubertal		Multiple Age Categories
	Adolescent	Adult	
Males more			
No signif. difference			
Females more	**EUROPE** *Sweden*: Nylander 1971 **NORTH AMERICA** *United States*: Huenemann et al. 1966; SL Kaplan et al. 1988; RS Strauss 1999 (young); DT Barry & Grilo 2002:339 **OCEANIA** *Australia*: Tiggemann & Pennington 1990	**EUROPE** *Britain*: Furnham et al. 2000; Wardle & Johnson 2002; *Sweden*: Bergstrom et al. 2000 **NORTH AMERICA** *United States*: Montoye et al. 1965; J Rodin et al. 1985*; Lerner et al. 1973 (young); SH Gray 1977 (young); Fallon & Rozin 1985 (young); Lundholm & Anderson 1986 (young); DM Zuckerman et al. 1986 (college); Drewnowski & Yee 1987 (young); Connor-Green 1988; S Hamilton & Fagot 1988 (young); Szekely et al. 1989 (college); M Harris et al. 1991 (college); BJ Rolls et al. 1991; Demarest & Langer 1996 (college); Pingitore et al. 1997; Henriques & Calhoun 1999; Oates-Johnson & DeCourville 1999 (college); Wichstrom 1999; Demarest & Allen 2000 (college); Kabeer et al. 2001:134; Spillane et al. 2004:91 (college)	**EUROPE** *Netherlands*: Blokstra et al. 1999 **NORTH AMERICA** *Canada*: Gupta et al. 1991; *United States*: Klesges 1983; Rodin et al. 1985*; JC Rosen & Gross 1987; Pliner et al. 1990; Pingitore et al. 1997; Tomori & Rus-Makovec 2000:363 **OCEANIA** *Australia*: Tiggemann 1992

5.7.3. Self-Assessed Mental, Intellectual, & Academic Ability

Self-assessment is used a great deal for estimating human intellectual abilities. The tables to follow provide a summary of the findings.

5.7.3.1. Self-Assessed Academic/Intellectual Ability/Competence in General

Numerous studies have asked subjects to rate their general academic or intellectual abilities. As shown in Table 5.7.3.1, these studies have concluded that among school aged children, there are often no significant differences given by boys and girls to such questions. However, the table shows that during adolescence, and especially among adults (usually college students), males nearly always rate their own overall academic and intellectual abilities higher than do females (also see the meta-analysis by Furnham 2001).

Table 5.7.3.1. Self-assessed academic/intellectual ability/competence in general.

Nature of Any Difference	Prepubertal				Postpubertal		Multiple Age Categories
				Childhood	Adolescent	Adult	
Males higher				**NORTH AMERICA** *United States*: Crandall 1969; Montanelli & Hill 1969 (experimental task); Ryan & Strawbridge 1969; AH Stein et al. 1971; J Parsons et al. 1976; Parsons & Ruble 1977; Meece et al. 1982; Whitley et al. 1986; Frey & Ruble 1987; Nottelmann 1987 Pressley et al. 1987; Stipek 1992; D Cole et al. 1999	**ASIA** *Hong Kong*: Lau 1990 **NORTH AMERICA** *United States*: Buxton 1973; Gitelson et al. 1982; DeBacker & Nelson 2000	**ASIA** *China*: Zhang & Gong 2001 (college undergraduates); Furnham et al. 2002a **EUROPE** *Britain*: Furnham & R Rawles 1995 (young); Furnham & Gasson 1998 (young); Furnham 1999 (young); Furnham et al. 2002b (ages 20-77); *Ireland*: J Reilly & G Mulhern 1995 (young); *Scotland*: H Beloff 1992 (young); M Bennett 1996 (young); *Slovakia*: Furnham et al. 1999 (college) **MIDDLE EAST** *Iran*: Furnham et al 2002c (college) **NORTH AMERICA** *Canada*: Mura 1987 (ability to earn PhD); *United States*: Battle 1965 (college); Horner 1970 (young); Lenney 1977 (college); Erkut 1983 (college freshman); Sleeper & Nigro 1987 (college); Beloff 1992; Beyer 1999 (college) **INTERNATIONAL** *Multiple Countries*: Furnham et al. 1999b (young, Britain, Hawaii & Singapore); Furnham & Baguma 1999 (young, Britain, US, & Uganda); Furnham et al. 2000 (Britain, United States, Japan, college); Furnham & Buchanan 2005 (ages 21-40)	**NORTH AMERICA** *United States*: Broverman et al. 1972; Hogan 1978 (high school and adults)
No signif. differ.				**EUROPE** *Britain*: Finchan et al. 1987 **NORTH AMERICA** *United States*: Dweck et al. 1980(mixed findings); GC Roberts et al. 1981; Pintrich & Blumenfield 1981; Stipek 1981; Harter 1982; Eccles-Parsons et al. 1984; D Phillips 1984; Stipek & Tannatt 1984; HW Marsh et al. 1985b; Stigler et al. 1985; Blechman et al. 1986; HW Stevenson & Newman 1986; Connell & Ilardi 1987; Nottelmann 1987; Schunk et al. 1987; Ilardi & Bridges 1988; Stipek & Daniels 1988; Boivin & Begin 1989; Schunk & Hanson 1989; Vondra et al. 1989; CJ Patterson et al. 1990; Skaalvik 1990; Skaalvik & Rankin 1990; DA Cole 1991a; HW Marsh et al. 1991 **OCEANIA** *Australia*: HW Marsh 1989; *Philippines*: D Watkins 1982b	**ASIA** *Singapore*: Liu & Wang 2005 **NORTH AMERICA** *United States*: Nottelmann & Welsh 1986 **OCEANIA** *Australia*: HW Marsh et al. 1985	**OCEANIA** *New Zealand*: M Byrd & R Stacey 1993 (young)	
Females higher				**EUROPE** *Finland*: Suonpaa et al. 1989 **NORTH AMERICA** *United States*: Marsh et al. 1984; A Miller 1985; Plummer & Graziano 1987; LK Chan 1988; Marsh 1989		**EUROPE** *Germany*: Rammstedt & Rammsayer 2000 (college, regarding interpersonal relationships)	

5.7.3.2. Self-Assessed Intelligence/IQ in Particular

Some researchers have sought to estimate intelligence by simply asking subjects to rate the nature of their own intelligence. Studies that have correlated actual test scores with self-rated scores have found the coefficients to be around r = .30 (Furnham et al. 2002:245).

According to studies cited in Table 5.7.3.2, most studies have found males rating their intelligence higher than do females. Later in this book (Chapter 12), the results of research that has compared the IQ ratings given to parents and to offspring depending on the sex of who is being rated are examined.

Table 5.7.3.2. Self-assessed intelligence/IQ in particular.

Nature of Any Difference	Prepubertal	Postpubertal		Multiple Age Categories
	Childhood	Adolescent	Adult	
Males higher		**EUROPE** *Britain*: Furnham 2001*	**ASIA** *China*: Zhang & Gong 2001 **EUROPE** *Belgium*: Furnham et al. 1999a* (young); *Britain*: Belof 1992 (college); Furnham & Rawles 1995 (college); Reilly & Mulhern 1995 (young); Furnham & Gasson 1998; Furnham et al. 1999a* (young); Furnham & Rawles 1999 (college); Furnham et al. 2000 (college); Furnham 2001*; Furnham et al. 2002a* (college); Petrides et al. 2004:153 (college); *Germany*: Rammstedt & Rammsayer 2001*; *Ireland*: Reilly & Mulhern 1995; *Slovakia*: Furnham et al. 1999a*; Furnham et al. 1999c* (young); *Scotland*: Beloff 1992* (young) **LATIN AMERICA** *Argentina*: A Furnham & Chamorro-Premuzic 2005 (college) **MIDDLE EAST** *Iran*: Furnham, Shahidi et al. 2002b:279 (young) **NORTH AMERICA** *United States*: H Hogan 1978 (college); Beloff 1992* (college); M Bennett 1996 (college); Furnham et al. 2002a* (college) **OCEANIA** *New Zealand*: Furnham & Ward 2001 (college) **INTERNATIONAL** *Multiple Countries*: Furnham et al. 1999 (college); Furnham & Baguma 1999; Furnham et al. 2002 (college)	**EUROPE** *Britain*: Furnham 1999* (practical & verbal IQ)
No signif. difference	**EUROPE** *Germany*: Rammstedt & Rammsayer 2001*		**EUROPE** *Britain*: M Byrd & Stacy 1993 (college); Furnham et al. 1999a* (verbal IQ); Furnham 2002 **OCEANIA** *New Zealand*: M Byrd & Stacey 1993 (college) **INTERNATIONAL** *Multiple Countries*: Furnham & Baguma 1999 (young, overall IQ); Furnham et al. 1999b (young, verbal & social IQ); Furnham et al. 1999c*	**EUROPE** *Britain*: Furnham 1999* (social IQ)
Females higher				

5.7.3.3. Correlation Between Self-Assessed IQ and Grades

A few studies have sought to determine if males or females exhibit a higher degree of correlation between how they assess their basic intelligence and the grades they receive in school. As shown in Table 5.7.3.3, these studies have found that the correlation is stronger in the case of males than females.

Table 5.7.3.3. Correlation between self-assessed IQ and grades.

Nature of Any Difference	Prepubertal	Postpubertal	
	Childhood	Adolescent	Adult
Males higher	**NORTH AMERICA** *United States*: V Crandall et al. 1962	**NORTH AMERICA** *United States*: BN Phillips et al. 1960; JS Coleman 1961	**NORTH AMERICA** *United States*: Terman & Oden 1947
No signif. difference			
Females higher			

5.7.3.4. Self-Assessed Language Skill/Verbal Ability

The few studies in which both sexes rated their language skills all revealed that females gave themselves higher scores than did males (Table 5.7.3.4).

Table 5.7.3.4. Self-assessed language skill/verbal ability.

Nature of Any Difference	Prepubertal	Postpubertal
	Childhood	Adolescent
Males better		
No signif. difference		
Females better	**NORTH AMERICA** *United States*: Eccles et al. 1984b; Jacobs & Eccles 1992; Jacobs et al. 2002:517* (self-rated in English & literature)	**NORTH AMERICA** *Canada*: Lupart et al. 2004 (English & language); *United States*: Eccles et al. 1989 (English); Jacobs et al. 2002:517* (self-rated in English & literature)

5.7.3.5. Self-Assessed Reading Skill/Ability

According to most studies, females give higher ratings to their abilities to read than do males, although there are several instances in which no significant gender differences were detected (Table 5.7.3.5).

Table 5.7.3.5. Self-assessed reading skill/ability.

Nature of Any Difference	Prepubertal	Postpubertal
	Childhood	Adolescent
Males higher	**NORTH AMERICA** *United States*: Zimmerman & Martinez-Pons 1990	
No signif. difference	**EUROPE** *Britain*: Blatchford 1992 **NORTH AMERICA** *United States*: Nicholls 1979; HW Marsh 1986; HW Stevenson & Newman 1986; Frey & Ruble 1987; Eccles et al. 1993	
Females higher	**NORTH AMERICA** *United States*: Nicholls 1979; Marsh et al. 1984; A Miller 1985; HW Marsh et al. 1985b; HW Marsh 1989; Skaalvik & Rankin 1990; HW Marsh et al. 1991	**NORTH AMERICA** *United States*: Entwisle & Baker 1983 (young)

5.7.3.6. Self-Assessed Math/Spatial/Science Reasoning Skill/Ability

Considerable research has sought to determine how males and females perceived their abilities in such areas as math and science. As shown in Split-Table 5.7.3.6a, results are mixed between males rating their abilities higher and no significant gender differences prior to puberty.

Split-Table 5.7.3.6a. Self-assessed math/spatial/science reasoning skill/ability.

Nature of Any Difference	Prepubertal
	Childhood
Males higher	**EUROPE** *Britain*: Claire & Redpath 1989; *Germany*: Rammstedt & Rammsayer 2001* (math & spatial reasoning); Dickhauser & Steinsmeier-Pelster 2003 **NORTH AMERICA** *United States*: Sieber 1979 (science); Eccles-Parsons et al. 1982a*; Kahle & Lakes 1983; HW Marsh et al. 1983; HW Marsh et al. 1985b; HW Stevenson & Newman 1986; HW Marsh 1989; Lynn & Hyde 1989; Stipek & Gralinski 1991 (math); Wigfield & Eccles 1992 (math); Eccles et al. 1993; Catsambis 1995 (science); Weinberg 1995 (science, meta analysis); Lee & Burkham 1996 (science); Helmke 1999 (math); Jacobs et al. 2002:517*; Crombie et al. 2005 (grades 8 & 9)
No signif. difference	**EUROPE** *Britain*: Blatchford 1992 **NORTH AMERICA** *United States*: Eccles-Parsons et al. 1982a*; Schunk 1982 (math); Schunk 1983a (math); Schunk 1983b (math); Schunk1983c (math); Entwisle & Baker 1983 (math); HW Marsh et al. 1984; Schunk 1984 (math); HW Marsh 1986; SA Miller et al. 1988; Skaalvik & Rankin 1990; Zimmerman & Martinez-Pons 1990 (math); HW Marsh et al. 1991
Females higher	

However, Split-Table 5.7.3.6b suggests that after puberty, nearly all studies have concluded that males rate their math, spatial, and science abilities higher than do females. This generalization largely coincides with a meta-analysis by Furnham (2001).

Split-Table 5.7.3.6b. Self-assessed math/spatial/science reasoning skill/ability.

Nature of Any Difference	Postpubertal		Multiple Age Categories
	Adolescent	Adult	
Males higher	**NORTH AMERICA** *Canada*: Lupart et al. 2004 (science); *United States*: Fennema & Sherman 1976; Fennema & Sherman 1977; Fennema & Sherman 1978; Fennema 1979; Sherman 1980; Gitelson et al. 1982; Eccles et al. 1983; Eccles-Parsons et al. 1983; Entwisle & Baker 1983 (young); Eccles et al. 1984b; Eccles-Parsons 1984; Boswell 1985; J Stallings 1985; J Oakes 1990 (math); Meyer 1992; Randhawa et al. 1993 (math); Pajares 1996 (math); Manger & Eikeland 1998 (math); V O'Brien et al. 1999; DeBacker & Nelson 2000 (science); Wigfield & Eccles 2000; Jacobs et al. 2002 (math); Jacobs et al. 2002:517* **OCEANIA** *Australia*: HW Marsh & Yeung 1998; Bornholt 2000:361 (especially at co-ed schools)	**ASIA** *China*: Furnham et al. 2002a **EUROPE** *Britain*: Furnham & Rawles 1995 (overall); Furnham et al. 1999a (young, math & spatial reasoning); Furnham 2000; Furnham et al. 2002b (ages 20-77); *Germany*: Rammstedt & Rammsayer 2000* (math, spatial reasoning, logic, college); Rammstedt & Rammsayer 2001* (college, math & spatial); Rammstedt & Rammsayer 2002b* (young, math & spatial IQ); *Scotland*: Bennett 2000 (college); *Slovakia*: Furnham et al. 1999 (college) **NORTH AMERICA** *United States*: L Brush 1979 (young); Stallings 1979 (young); G Hackett & N Campbell 1987 (young) **INTERNATIONAL** *Multiple countries*: Furnham & Baguma 1999* (numeric IQ); Furnham et al. 1999b (young, overall math & spatial); Furnham et al. 1999c (young, math & spatial); Furnham et al. 2002d (Britain, United States, Japan, college)	**EUROPE** *Britain*: Furnham et al. 2000a (math & spatial); Furnham & Ward 2001 (math & spatial) **NORTH AMERICA** *United States*: Trankina 1993 (science) **INTERNATIONAL** *Multiple countries*: Furnham & Baguma 1999* (math & spatial); Furnham et al. 1999b (math & spatial)
No signif. difference		**MIDDLE EAST** *Iran*: Furnham et al. 2002c (college)	
Females higher		**MIDDLE EAST** *Iran*: Furnham et al. 2002b:279 (college)	

5.7.3.7. Self-Assessed Computer Skills

The research that has sought to determine if a gender difference exists in people's ratings of their overall computer skills have all concluded that males rate theirs higher than do females (Table 5.7.3.7).

Table 5.7.3.7. Self-assessed computer skills.

Nature of Any Difference					Postpubertal	
						Adult
Males more						**MIDDLE EAST** *Iran*: Shashaani & Khalili 2001 (college) **NORTH AMERICA** *United States*: VA Clarke & Chambers 1989 (college); Tonkzadeh & Koufteros 1994; T Busch 1995
No signif. difference						
Females more						

5.7.3.8. Self-Assessed Musical Ability

In the case of self-assessed musical ability, studies have either found females considering themselves to be more capable or there to be no significant sex differences (Table 5.7.3.8).

Table 5.7.3.8. Self-assessed musical ability.

Nature of Any Difference					Postpubertal	
						Adult
Males more						**EUROPE** *Britain*: Furnham et al. 2002 (college self-rated musical intelligence) **LATIN AMERICA** *Argentina*: Furnham & Chamorro-Premuzic 2005 (college self-rated musical intelligence)
No signif. difference						
Females more						

5.7.4. Self-Assessed Behavior and Personality

A number of studies have sought to determine if males or females assess various aspects of their behavior or personality differently. Findings are reviewed below.

5.7.4.1. Self-Assessed Leadership Skills

Two studies were located regarding self-assessed leadership skills. Both found that males gave themselves higher ratings than did females (Table 5.7.4.1).

Table 5.7.4.1. Self-assessed leadership skills.

Nature of Any Difference					Postpubertal	
						Adult
Males more						**NORTH AMERICA** *United States*: Tsui 1998:368 (college); JT Spence & Buckner 2000:49
No signif. difference						
Females more						

5.7.4.2. Self-Assessed Social Connectedness to Others

The research pertaining to how the sexes rate their social connectedness have all concluded that relative to the ratings of males, those by females indicate that women consider themselves to be more socially connected than men (Table 5.7.4.2).

Table 5.7.4.2. Self-assessment social connectedness to others.

Nature of Any Difference					Postpubertal		Multiple Categories
						Adult	
Males more							
No signif. difference							
Females more						**NORTH AMERICA** *United States*: Mackie 1983; Bybee et al. 1990 (college); Boggiano & Barrett 1991 (college)	**NORTH AMERICA** *United States*: MW Pratt et al. 1990; Ogilvie & Clark 1992; Clancy & Dollinger 1993

5.7.4.3. Self-Assessed Social/Interpersonal Skills

Little research was located concerning self-rated social skills. As shown in Table 5.7.4.3, this research has provided an inconsistent pattern. Interestingly, in the study of adolescents, even though males rated their social skills as being higher than did the females, adult observers of these same subjects rated the females as being significantly more socially skilled than the males (Sarason et al. 1985).

Table 5.7.4.3. Self-assessed social/interpersonal skills.

Nature of Any Difference					Postpubertal		
					Adolescent	Adult	
Males more					**NORTH AMERICA** *United States*: Sarason et al. 1985 (social skills)		
No signif. difference						**EUROPE** *Slovakia*: Kusa 2002:355 (college, yielding to will of others)	
Females more						**EUROPE** *Britain*: Petrides & Furnham 2000; Petrides & Furnham 2003; Furnham & Petrides 2004; *Germany*: Rammstedt & Rammsayer 2000 (college, interpersonal skills); *Netherlands*: Van der Zee et al. 2002; Van der Zee & Wabeke 2004 (managers & executives)	

5.7.4.4. Self-Assessed Social Responsibility

According to two studies, males consider themselves to be more socially responsible than do females (Table 5.7.4.4).

Table 5.7.4.4. Self-assessed social responsibility.

Nature of Any Difference					Postpubertal		
					Adolescent		
Males more					**EUROPE** *Britain*: Eiser et al. 1995a:311 **NORTH AMERICA** *United States*: Levit 1991		
No signif. difference							
Females more							

5.7.4.5. Self-Assessed Work-Related Skill/Ability

Findings concerning self-assessed work-related skills and abilities have not come to consistent conclusions regarding any gender differences. This may be largely the result of different types of work-related skills being assessed (Table 5.7.4.5).

Table 5.7.4.5. Self-assessed work-related skill/ability.

Nature of Any Difference					Postpubertal		
					Adolescent	Adult	
Males more						**EUROPE** *Germany*: Sieverding 2003 (job interview performance) **NORTH AMERICA** *United States*: B Major & Konar 1984 (employed)	
No signif. difference							
Females more					**NORTH AMERICA** *United States*: CE Schaefer 1969a (critical of artistic work)	**NORTH AMERICA** *United States*: F Barron 1965 (college, critical of artistic work)	

5.7.5. Confidence in One's Abilities

Studies that have assessed the degree to which males and females may differ in confidence surrounding their abilities are reviewed in the following tables.

5.7.5.1. Confidence in One's Abilities in General

Most studies have concluded that males express greater confidence in their abilities on a wide variety of tasks than do females (Table 5.7.5.1). This seems to be especially true following puberty.

Table 5.7.5.1. Confidence in one's abilities in general.

Nature of Any Difference	Prepubertal				Postpubertal	
				Childhood	Adolescent	Adult
Males more				**NORTH AMERICA** *United States*: Pollis & Doyle 1972 (self-rated abilities)	**NORTH AMERICA** *United States*: Fennema & Sherman 1976; JA Sherman 1980	**NORTH AMERICA** *United States*: Deaux & Emswiller 1974 (especially on masculine tasks); Deaux & Farris 1977; Meehan & Overton 1986; S Beyer 1990; Prince 1993 (financial matters); S Beyer & Bowden 1997
No signif. difference				**NORTH AMERICA** *United States*: Wheeler & Ladd 1982; SA Miller & Davis 1992		
Females more						

5.7.5.2. Confidence in One's Academic Ability

According to most studies, males express greater confidence in their academic abilities than do females (Table 5.7.5.2).

Table 5.7.5.2. Confidence in one's academic ability.

Nature of Any Difference					Postpubertal	
					Adolescent	Adult
Males more positive					**NORTH AMERICA** *United States*: Gitelson et al. 1982 (spatial reasoning)	**EUROPE** *Britain*: Stables & Stables 1995 (college, academic ability); B Read et al. 2001 (college, writing assignment) **NORTH AMERICA** *United States*: Janman 1987 (math); Mura 1987 (college, math); A Kelly 1988 (college, physics); Daubman et al. 1992 (college); M Crawford & MacLeod 1990 (college); Fassinger 1995 (college)
No signif. difference						**NORTH AMERICA** *United States*: Sleeper & Nigro 1987 (college, naming anagrams); Heatherington et al. 1993 (academic grades)
Females more positive						

5.7.5.3. Confidence in One's Ability to Form Close Interpersonal Relationships

Two studies have concluded that females have greater confidence than males do in their abilities to form close interpersonal relationships with others (Table 5.7.5.3).

Table 5.7.5.3. Confidence in one's ability to form close interpersonal relationships.

Nature of Any Dif-ference					Postpubertal	
						Adult
Males more positive						
No signif. difference						
Females more positive						**NORTH AMERICA** *United States*: Savin-Williams & Berndt 1990 (young); Hagborg 1993 (young)

5.7.5.4. Confidence in One's Ability to Perform Various Experimental Tasks

Numerous studies have described or demonstrated an experimental task to individuals and then asked them to estimate their confidence in performing the task themselves. As shown in Table 5.7.5.4, most studies have either concluded that males rate their ability as higher or that there is no significant sex difference in the ratings given.

Table 5.7.5.4. Confidence in one's ability to perform various experimental tasks.

Nature of Any Difference	Prepubertal					
				Childhood		Adult
Males higher				**NORTH AMERICA** *United States*: Stein et al. 1971 (6th grade, masculine tasks); Pollis & Doyle 1972; Ruble & Nakamura 1973; Ruble 1975; IK Krauss 1977; C Ames 1978; C Ames 1981		**NORTH AMERICA** *United States*: Beyer 1990 (college); Beyer & Bowden 1997 (college); Beyer 1998 (college)
No signif. difference				**EUROPE** *Britain*: R Butler 1990 **NORTH AMERICA** *United States*: P Bruce 1974; Ruble et al. 1976; RS Feldman & Bernstein 1977; Cicirelli 1978a; Diener & Dweck 1980; Ruble et al. 1980; RS Newman & Wick 1987; SA Miller et al. 1988; Stipek & Kowalski 1989; Nelson-Le Gall et al. 1990		
Females higher				**NORTH AMERICA** *United States*: Ruble & Nakamura 1973; A Miller 1985		

5.7.5.5. Confidence in One's Ability to Perform Tasks After Experimentally Induced Failure

Studies of an individual's confidence in being able to perform various tasks have sometimes been manipulated by experimentally ensuring that subjects fail at a task. Table 5.7.5.5 shows that in most cases, this manipulation impacts males and females equally, but in a couple of studies males emerged more confident than females.

Table 5.7.5.5. Confidence in one's ability to perform tasks after experimentally induced failure.

Nature of Any Difference	Prepubertal				Postpubertal	
				Childhood	Adolescent	
Males more				**NORTH AMERICA** *United States*: JG Nicholls 1975	**NORTH AMERICA** *United States*: Eccles et al. 1984b	
No signif. difference				**NORTH AMERICA** *United States*: Diener et al. 1975; MM Clifford 1975; Santrock & Ross 1975; Fulkerson et al. 1983; Kaslow et al. 1984; Stipeck et al. 1984; Frey & Ruble 1987; Wigfield 1988; Schneider et al. 1989; Stipeck & Kowalski 1989		
Females more						

5.7.5.6. Confidence in One's Ability to Socially Interact With Others

Several studies have sought to determine if a sex difference exists in the degree to which individuals have confidence in their abilities to socially interact with others. Table 5.7.5.6 indicates that few significant difference exist, at least among school age children.

Table 5.7.5.6. Confidence in one's ability to socially interact with others.

Nature of Any Difference	Prepubertal					
				Childhood		
Males higher				**NORTH AMERICA** *United States*: CJ Patterson et al. 1990		
No signif. difference				**ASIA** *China*: Stigler et al. 1985 **NORTH AMERICA** *United States*: GC Roberts et al. 1981; Harter 1982; Kurdek & Krile 1982; HW Marsh et al. 1983; Blechman et al. 1986; Nottelmann & Welsh 1986; LK Chan 1988; Buckner & Fivush 1998:417 (self-rated alienation); Boivin & Begin 1989; Vondra et al. 1989; DA Cole 1991a; HW Marsh et al. 1991		
Females higher				**EUROPE** *Finland*: Suonpaa et al. 1989		

5.7.5.7. Confidence in One's Driving Ability

The few studies in which males and females have both self-rated their driving abilities have all found males giving themselves higher ratings that those given by females (Table 5.7.5.7).

Table 5.7.5.7. Confidence in one's driving ability.

Nature of Any Difference				Postpubertal	
				Adolescent	
Males more				**NORTH AMERICA** *Canada*: J Rothe 1987; K Stoddart 1987; *United States*: D DeJoy 1992	
No signif. difference					
Females more					

5.7.5.8. Confidence in Estimating Future Events

Most studies of people's confidence in their abilities to estimate future events have had to do with future incomes. Table 5.7.5.8 shows that males express greater confidence than do females.

Table 5.7.5.8. Confidence in estimating future events.

Nature of Any Difference		Postpubertal
		Adult
Males more		**NORTH AMERICA** *United States*: Wallach & Kogan 1959 (young); LA Jackson et al. 1992 (college seniors, income); BA Martin 1989 (income); Kaman & Hartel 1994 (income); Gasser et al. 1998 (income); Hojat et al. 2000b (physician, income); Keaveny & Inderrieden 2000 (income); Heckert et al. 2002:145
No signif. difference		
Females more		

5.7.5.9. Confidence in One's Occupational (Professional) Skills

The available research on people's confidence in their occupational skills has all concluded that males provide higher ratings than do females (Table 5.7.5.9).

Table 5.7.5.9. Confidence in one's occupational (professional) skills.

Nature of Any Difference					Postpubertal
					Adult
Males more					**NORTH AMERICA** *United States*: JA Davis 1984 (police officers); Fiorentine 1988a (young); LB Johnson 1991 (police officers)
No signif. difference					
Females more					

5.7.5.10. Diminished Performance (or Performance Expectations) Following Past Failure

Most of the research on sex differences in whether past failure diminishes one's future performance or their anticipated future performance has concluded that boys and girls are adversely affected to an equal degree, although a few studies have found females more decimated in this regard than males (Table 5.7.5.10).

Table 5.7.5.10. Diminished performance (or performance expectations) of following past failure.

Nature of Any Difference				Prepubertal		
				Childhood		
Males more						
No signif. difference				**EUROPE** *Britain*: Hokoda et al. 1989 **NORTH AMERICA** *United States*: Dweck & Reppucci 1973; Lewis-Beck 1977; Diener & Dweck 1978; C Ames & Felker 1979; Diener & Dweck 1980; Rholes et al. 1980; Satterly & Hill 1983; Licht & Dweck 1984; Stipek et al. 1984; Stipek & Kowalski 1989		
Females more				**NORTH AMERICA** *United States*: JG Nicholls 1975; Dweck et al. 1980; Frieze & Bar-Tal 1980; Craske 1985; M Lewis et al. 1992		

5.7.6. Locus of Control

Locus of control has to do with whether people believe that they or forces outside themselves are primarily responsible for what happens to them. Research findings on sex differences in this and related topics are reviewed below.

5.7.6.1. Internal (vs. External) Locus of Control in General

Persons who see themselves as the captain of their own ship, rather than passengers on a boat that appears to be at the mercy of unpredictable outside forces, are said to have an internal locus of control. As shown in Table 5.7.6.1, on questionnaires designed to measure where individuals stand on the internal-external locus of control continuum, males nearly always score higher than do females.

Table 5.7.6.1. Internal (vs. external) locus of control in general.

Nature of Any Difference					Postpubertal		Multiple Age Categories
				Childhood	Adolescent	Adult	
Males more				**EUROPE** *Britain*: Head 1996 (external, blame others for failure)		**EUROPE** *Germany*: J Smith & M Baltes 1998 (elderly) **NORTH AMERICA** *United States*: JG Simon & Feather 1973 (college, attribute failure in a game or test to lack of effort or ability); Deaux & Emswiller 1974 (young); Sweeney et al. 1982 (college, attribute failure in a game or test to lack of effort or ability); Mirowsky & Ross 1983:236 (internal); WJ Doherty & Baldwin 1985 (young); JC Stapley & Haviland 1989 (inner directed vs other directed); Brody 1993 (inner-directed vs other directed); Nunn 1994 (college); Tang 1995:815 **INTERNATIONAL** *Several Industrial Countries*: McGinnies et al. 1974 (college); OA Parsons & Schneider 1974 (young)	**NORTH AMERICA** *United States*: Ryff 1989:1079
No signif. difference						**NORTH AMERICA** *United States*: Richert 1981 (young)	
Females more							

5.7.6.2. Attribute Success to Effort, Ability, and Other Internal Forces

How do you explain whatever success you may have in mastering various tasks? Would you attribute it to such things as hard work, talent, and dedication or to luck and the kindness of others? Various studies compared the average responses of males and females in regard to their tendencies to provide internal as opposed to external explanations for success at various tasks. The findings are summarized in Table 5.7.6.2. The findings tend to be fairly similar to those surrounding the concept of internal locus of control, with most studies reporting that males attribute success primarily to internal factors. Two reviews both concluded that whatever sex differences exist are small (Frieze et al. 1982; Sohn 1982).

Table 5.7.6.2. Attribute success to effort, ability, and other internal forces.

Nature of Any Difference	Prepubertal				Postpubertal		
				Childhood	Adolescent	Adult	
Males more				**EUROPE** *Britain*: Craske 1985 **MIDDLE EAST** *Israel*: Bar-Tal & Darom 1979 **NORTH AMERICA** *United States*: Garrett & Willoughby 1972; JG Nicholls 1975*; Etaugh & Ropp 1976; Nicholls 1979 (reading); Dweck et al. 1980; C Ames 1984; D Phillips 1984; Wittig 1985; Frey & Ruble 1987; Stipek & Gralinski 1991(math)	**NORTH AMERICA** *United States*: Ryckman & Peckham 1987 (math); DA Phillips & Zimmerman 1990	**NORTH AMERICA** *United States*: JG Simon & Feather 1973 (young); Nicholls 1975*; M Zuckerman 1979:254 **OCEANIA** *Australia*: Feather 1969b	
No signif. difference				**EUROPE** *Britain*: R Butler 1986; Finchan et al. 1987; Finchan et al. 1989; Hokoda et al. 1989 **NORTH AMERICA** *United States*: Dweck et al. 1978; C Ames & Felker 1979; Medway 1989; Diener & Dweck 1980; Fry & Ghosh 1980; Rholes et al. 1980; Ruble et al. 1980; C Ames 1981; Satterly & Hill 1983; Humble 1983; Kaslow et al. 1984; Licht & Dweck 1984; HW Marsh 1986; LG Ward et al. 1987; Wigfield 1988; CJ Robins & Hinkley 1989; McAuley et al. 1989 **MIDDLE EAST** *Israel*: Bar-Tal et al. 1982 **OCEANIA** *Philippines*: D Watkins 1982b		**MIDDLE EAST** *Israel*: Bar-Tal & Frieze 1976	
Females more					**NORTH AMERICA** *United States*: Wiegers & Frieze 1977 (academic success)	**NORTH AMERICA** *United States*: Feldman-Summers & Kiesler 1974 (rating physician performance); Levine et al. 1976 (college, anagram task); Heilman & Kram 1978 (effort); R Levine et al. 1982 (college, anagram task); JE Parsons et al. 1982 (success in math); Erkut 1983 (regarding academic success); LaNoue & Curtis 1985 (college)	

5.7.6.3. Attribute Personal Success to Luck or Other External Forces

As indicated in Table 5.7.6.3, nearly all relevant studies have concluded that females are more likely than males to attribute whatever personal success they may have to luck or other forces external to themselves. This conclusion is similar to those reached by Zuckerman (1979) in a general literature review and by a meta-analysis by Sohn (1982).

Table 5.7.6.3. Attribute personal success to luck or other external forces.

Nature of Any Dif-ference	Prepubertal				Postpubertal	
				Childhood		Adult
Males more						
No signif. difference						**NORTH AMERICA** *United States*: Sweeney et al. 1982 (college, luck); Karabenick et al. 1983 (college)
Females more				**NORTH AMERICA** *United States*: Crandall et al. 1962		**NORTH AMERICA** *United States*: Crandall 1969 (college); JG Simon & Feather 1973 (college, luck); Deaux & Emswiller 1974 (college); Deaux et al. 1975 (young); Nicholls 1975 (young); Bar-Tal & Frieze 1977 (college, luck); Deaux & Farris 1977 (young, luck); Dweck et al. 1978 (college); IH Frieze et al. 1978a (young, luck); Nieva & Gutek 1981 (employees); Pasquella et al. 1981; IH Frieze et al. 1982 (young); Gould & Slone 1982 (college, anagram task); Sohn 1982; RD Hanson & O'Leary 1985 (employees); Meehan & Overton 1986 (spatial perceptual task); Fiorentine 1988a (young) **OCEANIA** *Australia*: Feather 1969b; Simon & Feather 1973 (college, luck)

5.7.6.4. Attribute Failure to Internal Forces

All of the available studies on gender differences in the tendency to attribute failure to internal attributes (such as lack of sufficient ability and hard work) rather than to external factors (such as bad luck and efforts by others to prevent success) found this tendency to be more common among females than among males (Table 5.7.6.4).

Table 5.7.6.4. Attribute failure to internal forces.

Nature of Any Dif-ference				Postpubertal	
				Adolescent	Adult
Males more					
No signif. difference					
Females more				**NORTH AMERICA** *United States*: Deaux 1976a; Nicholls 1979; Wolleat et al. 1980	**EUROPE** *Britain*: T Blackstone & Weinreich-Haste 1980 (young) **NORTH AMERICA** *United States*: Feather & Simon 1973; Simon & Feather 1973; Nicholls 1975; Bar-Tal & Freize 1977; Ickes & Layden 1978; JE Parsons et al. 1982

5.7.7. Happiness/Satisfaction

Happiness and satisfaction are inherently subjective feelings pertaining to an individual's well-being. The importance of these aspects of one's subjective lives is underscored by the considerable amount of relevant research. Sex differences in self-reported happiness and satisfaction are reviewed here.

5.7.7.1. Emotional Well-being/Stability

As shown in Table 5.7.7.1, most studies have concluded that males are more likely to exhibit feelings of emotional well-being and emotional stability than are females, although some studies have failed to detect a significant gender difference in this regard.

Table 5.7.7.1. Emotional well-being/stability.

Nature of Any Dif-ference	Prepubertal				Postpubertal		Multiple Age Categories
				Childhood	Adolescent	Adult	
Males better				**EUROPE** *France*: Kinter-Remmlein 1933 **NORTH AMERICA** *United States*: E Mathews 1923	**NORTH AMERICA** *Canada*: RJ Burke & Weir 1978; *United States*: Schubert & Wagner 1936	**EUROPE** *Britain*: Mellanby et al. 2000:384 (college) **NORTH AMERICA** *United States*: Darley 1937 (clinical diagnosis); Haring et al. 1984	**NORTH AMERICA** *United States*: Shaver & Freedman 1976
No signif. difference						**NORTH AMERICA** *United States*: Pugliesi 1995:63; JS Levin & Chatters 1998:520 (elderly); K Williams 2003 (regarding marital status)	
Females better							

5.7.7.2. Personal Happiness (Satisfaction with Life)

Studies of self-assessed personal happiness have provided very mixed results regarding a gender difference (Table 5.7.7.2).

Table 5.7.7.2. Personal happiness (satisfaction with life).

Nature of Any Difference					Postpubertal		Multiple Age Categories
					Adolescent	Adult	
Males more					**NORTH AMERICA** *United States*: Crandall & Kytonen 1980*	**MIDDLE EAST** *Israel*: Kark et al. 1996 **NORTH AMERICA** *United States*: Kutner et al. 1956 (elderly); W Wilson 1967; RM Lerner et al. 1973 (college); Wenz 1977; Dickie et al. 1979 (elderly); Schmitt et al. 1979 (elderly); Crandall & Kytonen 1980* (young); Veroff et al. 1981*; Liang 1982 (middle age & elderly); Bronzaft & Hayes 1983; Flint et al. 1983 (elderly); Grant & Chappell 1983 (elderly); Gilhooly 1984; Lawton et al. 1984 (elderly); Shichman & Cooper 1984 (young & full); W Wood et al. 1989; Chang & White-Means 1991 (elderly, spousal caregivers); S McCann et al. 1991; Lehman et al. 1992 (mentally ill); Roxburgh 1996; Collins & Jones 1997 (elderly, spousal caregivers); Mroczek & Kolarz 1998; Rose-Rego et al. 1998 (elderly, spousal caregivers)	**NORTH AMERICA** *United States*: A Campbell et al. 1976* (Blacks); Lonigan et al. 1999
No signif. difference					**NORTH AMERICA** *United States*: Burke & Weir 1978 **OCEANIA** *New Zealand*: Chorpita et al. 2000	**AFRICA** *South Africa*: Ochse 1984 **EUROPE** *Britain*: SD Harding 1982 **NORTH AMERICA** *Canada*: Mercier et al. 1998 (mentally ill) *United States*: Gurin et al. 1960; Chilman & Meyer 1966 (young); Knupfer et al. 1966; Henley & Davis 1967 (elderly); Phillips 1967; Messer 1968 (elderly); Bradburn 1969 (young, full, & elderly); Cameron 1972a (young, full & elderly); Council on Aging 1972 (elderly); Alston & Dudley 1973; Edwards & Klemmack 1973; Hutchinson 1975 (elderly); FM Andrews & Withey 1976; Campbell et al. 1976 (young, full, & elderly); Toseland & Sykes 1977 (elderly); Inglehart 1978; Shin & Johnson 1978; Snider 1980 (elderly); Gilleard et al. 1981 (elderly); Lubinski et al. 1981 (young); Lee & Ellithrope 1982 (elderly); Collette 1984 (elderly); Dillard et al. 1984 (elderly); Fujita et al. 1991 (college, self-report) **OCEANIA** *Philippines*: Bulatao 1974	**NORTH AMERICA** *United States*: Czaja 1975; Shaver & Freedman 1976; Runyan 1980; A Campbell et al. 1981 (Whites); Veroff et al. 1981* (Whites); Borges et al. 1984; JS Levin et al. 1995:S160 (Blacks)
Females more						**EUROPE** *Finland*: Haavio-Mannila 1971; Hintikka et al. 2001a; *Netherlands*: Hartog & Oosterbeek 1998 **MIDDLE EAST** *Israel*: Cantril 1965 **NORTH AMERICA** *United States*: Cavan et al. 1949 (elderly); Brayfield et al. 1957; Maddox & Eisdorfer 1962 (elderly); Cantril 1965; Brand & Smith 1974 (elderly); Glenn 1975 (young & elderly); Critelli 1977 (young); Nehrke et al. 1977/1978 (elderly); Chiriboga et al. 1978 (young, full & elderly); Gove 1978; Tolor 1978 (young); Glenn & Weaver 1979 (young, full & elderly); Hearn 1980 (young); Rosenberg & Chelte 1980; Woods & Witte 1981 (elderly); Briscoe 1982 (middle-age & elderly); Baur & Okun 1983 (elderly); Lowry 1984 (elderly); Mutran & Reitzes 1984 (elderly) **OCEANIA** *Australia*: Grichting 1983; *New Zealand*: Kammann 1983	**NORTH AMERICA** *United States*: National Opinion Research Center 1991

5.7.7.3. Marital Happiness/Satisfaction with One's Spouse

Studies of whether husbands or wives are more likely to be satisfied with their spouses have come to inconsistent conclusions (Table 5.7.7.3).

Table 5.7.7.3. Marital happiness/satisfaction with one's spouse.

Nature of Any Difference						Postpubertal	Multiple Age Categories
						Adult	
Males more						**NORTH AMERICA** *United States*: Briscoe 1978; Sporakowsky & Hughston 1978 (elderly); Heiman & Verhulst 1982 (married couples, sexual aspects); Sekaran 1986; Stanley et al. 1986 (dual-earner household); Schumm et al. 1998 **OCEANIA** *Australia*: K Dempsey 2002:103	
No signif. difference						**NORTH AMERICA** *United States*: Murstein & Beck 1972:402 (young); Holahan & Gilbert 1979	**NORTH AMERICA** *United States*: Lipman 1961; Palmore & Luikart 1972; Dressler 1973; Lee 1978; Mutran & Reitzes 1984
Females more						**NORTH AMERICA** *United States*: Hayes & Stinnett 1971; Bernard 1972a; Burke & Weir 1976; Briscoe 1978; Mugford & Lally 1981	**NORTH AMERICA** *United States*: White 1979; Briscoe 1982

5.7.7.4. Satisfaction With Friendships

The two available studies of sex differences in satisfaction with one's friendship network have both concluded that females express greater satisfaction than do males (Table 5.7.7.4).

Table 5.7.7.4. Satisfaction with friendships.

Nature of Any Difference				Postpubertal	
				Adolescent	Adult
Males more					
No signif. difference					
Females more				**NORTH AMERICA** *United States*: Blyth et al. 1982 (cross-sex friendships)	**NORTH AMERICA** *United States*: JM Reisman 1990 (same-sex)

5.7.7.5. Satisfaction With One's Job in General/Job Satisfaction

While the studies of sex differences in job satisfaction have been numerous, the conclusions reached have been very inconsistent (Table 5.7.7.5).

Table 5.7.7.5. Satisfaction with one's job in general/job satisfaction.

Nature of Any Difference					Postpubertal		Multiple Age Categories
						Adult	
Males more						**MIDDLE EAST** *Israel*: MT Mednick 1975 **INTERNATIONAL** *Multiple Countries*: Sousa-Poza & Sousa-Poza 2000:141* (in 1 of 21 countries)	**NORTH AMERICA** *United States*: Hulin & Smith 1964; C Weaver 1974a; C Weaver 1974b; HJ Shapiro & Stern 1975* (professionals); Forgionne & Peeters 1982 (managers with many employees)
No signif. difference						**ASIA** *Taiwan*: Ma 1986 (college) **EUROPE** *Scotland*: ME Ward & Sloane 2000 **NORTH AMERICA** *United States*: Mirels & Garrett 1971; AP MacDonald 1972; CN Weaver 1978; Bokemeier & Lacy 1986; Mottaz 1986; Tang 1989; Loscocco 1990 (blue-collar workers); Tang & Tzeng 1992; Mutran et al. 1997:S93 (ages 58-64); Keaveny & Inderrieden 2000; SM Donohue & Heywood 2004 (young & middle age); TJ Hoff 2004:306 (physicians) **INTERNATIONAL** *Multiple Countries*: Sousa-Poza & Sousa-Poza 2000:141* (in 17 of 21 countries)	**NORTH AMERICA** *Canada*: M Burstein et al. 1975; MA Murray & Atkison 1981*; *United States*: McClusky & Strayer 1940 (teachers); FJ Harris 1949 (factory workers); R Quinn et al. 1971; Goodale 1973 (unemployed); R Quinn et al. 1974; Gaertner & Gaertner 1975; F Andrews & Withey 1976; A Campbell et al. 1976; C Weaver 1977; Buchholz 1978; Near 1978; Renwick & Lawler 1978; Sauser & York 1978; Ebeling et al. 1979; Fry & Greenfield 1980 (police); Weaver 1980; F Crosby 1982; DB Smith & Plant 1982 (professor); Golding et al. 1983 (lawyers); Kaldenberg et al. 1995 (dentists)
Females more						**EUROPE** *Britain*: Hakim 1991; AE Clark 1996; AE Clark 1997; CW Mueller & Wallace 1996; D Brown & McIntosh 1998; PJ Sloane & Williams 2000; A Sousa-Poza & Sousa-Poza 2000*; Sousa-Poza & Sousa-Poza 2003; *Scotland*: M Ward & Sloane 2000; M Ward & Sloane 2001 **NORTH AMERICA** *United States*: Bokemeier & Lacy 1986*; Meng 1990; CW Mueller & Wallace 1996; A Sousa-Poza & Sousa-Poza 2000* **OCEANIA** *Australia*: J Baxter et al. 1996 **INTERNATIONAL** *Multiple Countries*: Sousa-Poza & Sousa-Poza 2000:141* (in 3 of 21 countries)	**NORTH AMERICA** *Canada*: Murray & Atkinson 1981 (when attributes are controlled, e.g., pay, hours worked); D'Arcy et al. 1984 (when attributes are controlled, e.g., pay, hours worked); *United States*: Benge 1944; Habbe 1947 (insurance agents); Stockford & Kunze 1950 (store clerks); FS Chase 1951; HJ Shapiro & Stern 1975* (non-professionals)

5.7.7.6. Satisfaction With One's Co-Workers

A few studies have sought to determine if males or females are more satisfied with their co-workers. Table 5.7.7.6 indicates that the findings vary.

Table 5.7.7.6. Satisfaction with one's co-workers.

Nature of Any Difference					Postpubertal		Multiple Age Categories
						Adult	
Males more						**OCEANIA** *Australia*: Asmar 1999 (academic environment, among PhD students)	**NORTH AMERICA** *United States*: Hulin & Smith 1964; HJ Shapiro & Stern 1975
No signif. difference							**NORTH AMERICA** *United States*: Sauser & York 1978
Females more							**NORTH AMERICA** *United States*: K Bartol & Wortman 1975

5.7.8. Motivation/Optimism About the Future

People vary in their tendencies to be motivated and optimistic about the future. Studies of sex differences in such tendencies are reviewed below.

5.7.8.1. Achievement Motivation

The available research on one’s motivation to be successful in attaining various goals has found such motivation to be stronger for males than for females (Table 5.7.8.1).

Table 5.7.8.1. Achievement motivation.

Nature of Any Difference				Postpubertal	
					Adult
Males more					**EUROPE** *Hungary*: Elizur et al. 1995:68 **NORTH AMERICA** *United States*: Veroff 1969 (young)
No signif. difference					
Females more					

5.7.8.2. Expectations of Success

According to the studies summarized in Table 5.7.8.2, males are more likely than females to express optimism about their potential for success at both academic and occupational pursuits.

Table 5.7.8.2. Expectations of success.

Nature of Any Difference				Postpubertal	
				Adolescent	Adult
Males higher				**NORTH AMERICA** *United States*: AR Gold et al. 1980; Erkut 1983; Ishiyama & Chabassol 1985	**NORTH AMERICA** *United States*: VC Crandall 1969:28 (A, young); JE Parsons et al. 1976 (young); Gitelson et al. 1982 (young); Stake 1983 (young); Vollmer 1986 (young); Ilardi & Bridges 1988 (young)
No signif. difference					
Females higher					

5.8
MENTAL ILLNESS

A tremendous amount of scientific research has been carried out to assess gender differences in mental illness. Many of these studies focused on very broadly defined forms of mental illness, while others have concentrated on specific types of illnesses. The numerous tables below provide a summary of the findings from these research efforts.

5.8.1. Broad Manifestation of Mental Illness

The construct of mental illness in Section 5.8.1 was construed in many different ways; most of the studies were concerned with the question of whether the sexes differ in mental health. Although the evidence is somewhat mixed with regard to the United States, Asia, Africa, and Sweden, most of the studies found that females were more likely to suffer from mental illnesses of various types.

5.8.1.1. Mental Illness in General

Using a wide variety of measurement procedures, a substantial majority of studies have concluded that mental illness in general is more characteristic of females than of males (Table 5.8.1.1). This conclusion coincides with one reached by Gove and Tudor (1973:823).

Table 5.8.1.1. Mental illness in general.

Nature of Any Difference	Prepubertal	Postpubertal		Multiple Age Categories
	Childhood	Adolescent	Adult	
Males more	**NORTH AMERICA** *United States*: Gove & Herb 1974*; Gove 1979:37*		**NORTH AMERICA** *United States*: LN Robins et al. 1984 (more often diagnosed overall)	**AFRICA** *Ethiopia*: Giel & van Luijk 1969; *Nigeria*: Erinosho & Ayonrinde 1981:293
No signif. difference		**NORTH AMERICA** *United States*: Gove 1979:37*; RJ Turner & Gil 2002	**ASIA** *China*: Anson & Sun 2002:1051 **NORTH AMERICA** *United States*: Gove 1972b* (among unmarried persons); JK Myers et al. 1984 (diagnosis, 6-month prevalence)	**EUROPE** *Sweden*: Halldin 1985a:118* ("serious")
Females more	**NORTH AMERICA** *Canada*: Luce & Wand 1977:81* (institutionalized)	**NORTH AMERICA** *Canada*: Luce & Wand 1977:81* (institutionalized); *United States*: Gove & Herb 1974*; Aro et al. 1989; Eiser et al. 1995:311 (young adolescents); Polce-Lynch et al. 1998; Grella et al. 2001 (substance abuse treatment clients); McCabe et al. 2002 (delinquents)	**EUROPE** *Britain*: Stringer et al. 1978 (young); J Archer & Lloyd 1985 (admissions to mental hospitals) **NORTH AMERICA** *United States*: M Shepherd & Gruenberg 1957; Kessel & Shepherd 1962; DL Phillips 1964 (self-report); DL Phillips 1966 (self-report); DL Phillips & Segal 1969 (self-report); Chesler 1971 (hospitalization); Gove 1972b* (among married persons); Gove & Tudor 1973 (self-report); Clancy & Gove 1976; Faden 1977; JE Barrett et al. 1988; Regier et al. 1988; ML Griffin et al. 1989 (cocaine abusers); LN Robins & Regier 1991; JJ Cochran et al. 1992 (self-report, among alcoholics); KT Brady et al. 1993 (substance abusers); JS Levin & Chatters 1998:520	**AFRICA** *Ethiopia*: L Jacobsson 1985 **ASIA** *India*: Nandi et al. 1977 (rural); Nandi et al. 1979:281 **EUROPE** *Britain*: Watts 1962; M Shepherd et al. 1966; Bebbington et al. 1981; *Iceland*: Helgason & Asmundsson 1980:63; Meltzer et al. 1995 (more women diagnosed with mental disorders); Colhoun & Prescott-Clarke 1996 (self-report); R Jenkins et al. 1997 (self-report); *Netherlands*: ten Have et al. 1996:148; Rabinowitz et al. 1999 *Sweden*: Halldin 1985a:118* ("mild") **MIDDLE EAST** *Iran*: Bash & Bash Liechti 1974:166 **NORTH AMERICA** *United States*: Gurin et al. 1960 (self-diagnosed); Ryle 1960; JA Davis 1962 (self-diagnosed); Langner & Michael 1963a (self-diagnosed); Hannaford 1966:22; DL Phillips 1966 (self-diagnosed); Locke & Gardner 1969; DL Phillips & Segal 1969:62; Rosen et al. 1972; Gove & Tudor 1973; Pendergrass 1974; Gove 1978; R Eme 1979:591; Gove 1979:44; Linzer et al. 1996; Simoni-Wastila 2000:291; Stevens et al. 2004 (self-diagnosed) **OCEANIA** *Australia*: Ingham et al. 1972; Finlay-Jones & Burvill 1978:458

5.8.1.2. Seeking/Obtaining Mental Health Services in General

According to several studies, females seek and/or actually utilize mental health services more than do males (Table 5.8.1.2.).

Table 5.8.1.2. Seeking/obtaining mental health services in general.

Nature of Any Difference	Prepubertal	Postpubertal
	Childhood	Adult
Males more		
No signif. difference		
Females more	**NORTH AMERICA** *United States*: CE Lewis et al. 1977	**EUROPE** *Britain*: Surtees et al. 2002:28 (college) **NORTH AMERICA** *Canada*: Bland et al. 1997; Lewinsohn et al. 1998 (persons with symptoms of depression); *United States*: DL Phillips & Segal 1969; Kessler & McRae 1981; Verbrugge 1985a; Prosser-Gelwick & Garni 1988 (college) **OCEANIA** *Australia*: Parslow & Jorm 2000

5.8.1.3. Seeking/Obtaining Medical/Psychological/Emotional Help for Depression

Two studies indicate that females are more likely than males to seek professional help for the purpose of relieving symptoms of depression (Table 5.8.1.3).

Table 5.8.1.3. Seeking/obtaining medical/psychological/emotional services for depression.

Nature of Any Difference	Postpubertal	Multiple Age Categories
	Adult	
Males more		
No signif. difference		
Females more	**NORTH AMERICA** *United States*: Weissman & Klerman 1977	**NORTH AMERICA** *United States*: MA Young et al. 1990

5.8.1.4. Seeking/Obtaining Medical/Psychological Help for Drug Dependency

Several studies have sought to determine if there is a sex difference in the tendency to seek help for any drug dependency they might have. As shown in Table 5.8.1.4, most results have found males being more likely to seek help, at least in the case of alcoholism or when pressured to do so by the threat of more severe criminal sanctions as an alternative. Females, however, appear to seek help for substance abuse problems other than alcoholism more than do males.

Table 5.8.1.4. Seeking/obtaining medical/psychological help for drug dependency.

Nature of Any Difference				Postpubertal		Multiple Age Categories
				Adolescent	Adult	
Males more				**NORTH AMERICA** *United States*: Farabee et al. 2001 (under criminal justice supervision); Stevens et al. 2004 (under criminal justice supervision)	**NORTH AMERICA** *United States*: BF Grant et al. 1994 (alcoholism); Weisner et al. 1995 (alcoholism); DA Dawson 1996a (alcoholism); Moos et al. 2004a:833 (elderly, alcoholism for heavy drinkers)	
No signif. difference						
Females more					**EUROPE** *Britain*: Betsy 1986 (alcohol problem) **NORTH AMERICA** *United States*: Kosten et al. 1993 (cocaine users, earlier); CG Schutz et al. 1994 (substance abusers); Arfken et al. 2001 (substance abusers, earlier); Grella et al. 2002 (cocaine users, earlier)	**EUROPE** *Finland*: Ravndal 1991 **NORTH AMERICA** *United States*: Hser et al. 1987

5.8.1.5. Behavioral Disturbances

Virtually all studies of gender differences in behavioral disturbances have concluded that males exhibit such disturbances more than do females, especially among school age children (Table 5.8.1.5).

Table 5.8.1.5. Behavioral disturbances.

Nature of Any Difference	Prepubertal				Postpubertal		Multiple Age Categories
				Childhood	Adolescent	Adult	
More in males				**ASIA** *China*: Rutter et al. 1974:250; Ekblad 1990:787 **EUROPE** *Britain*: J Cumming 1944; Rutter et al. 1970:205; R Cochrane 1979:204; Rutter 1988; Thapar & McGuffin 1996:1113; *Sweden*: Magnusson et al. 1975; *Netherlands*: Verhulst et al. 1990:424; Verhulst et al. 1997a; *Norway*: Schulz Jorgensen et al. 1993; Backe-Hansen & Ogden 1996:340 **NORTH AMERICA** *Canada*: Luce & Wand 1977:82; Offord et al. 1986:275; Marriage et al. 1986:688; Offord et al. 1987:834; Rae-Grant et al. 1989; Offord et al. 1991; *United States*: L Epstein 1941; CR Rogers 1942; Griffiths 1952; Ullman 1952; Glidewell et al. 1957; Beilin 1959; Goldfarb 1963; Glidewell 1968; Widom 1977; Cairns & Cairns 1984; Roff & Wirt 1984; Jary & Stewart 1985:11; Richman et al. 1985a; Velez 1989:862; Gresham & Elliot 1990; Gabel & Shindledecker 1991; Loeber & Keenan 1994; Comings 1995:148; Ellickson et al. 1997:989; McDermott 1996	**EUROPE** *Britain*: Graham & Rutter 1973; Leslie 1974; *Finland*: Almqvist 1986:296 **NORTH AMERICA** *United States*: Frisk et al. 1966:132; Lewinsohn et al. 1993; Marcus & Betzer 1996 **OCEANIA** *New Zealand*: McGee et al. 1990	**EUROPE** *Britain*: Edelmann & Vivian 1988:583 (young) **NORTH AMERICA** *Canada*: Forth et al. 1996 (young)	**EUROPE** *Denmark*: Cloninger et al. 1978a; *Sweden*: Halldin 1984:511 **MIDDLE EAST** *Israel*: Dohrenwend et al. 1992:949 **NORTH AMERICA** *Canada*: Hare 1980; Swanson et al. 1994; *United States*: Cloninger et al. 1975a, Guze 1976; Mednick et al. 1977; Robins 1978:264; Cantwell 1981:22; Cadoret et al. 1984:3; Fox 1984; Robins et al. 1984; Coolidge et al. 1990; Cottler et al. 1995 **OCEANIA** *New Zealand*: Mulder et al. 1994
No signif. difference				**NORTH AMERICA** *United States*: J MacFarlane et al. 1954			
More in females							

5.8.1.6. Psychoneurosis/Psychotic/Psychosomatic Disorders

Research has not reached consistent conclusions regarding the existence of any gender differences in such rather vaguely identified disorders as psychoneurosis and psychosomatic disorders (Table 5.8.1.6).

Table 5.8.1.6. Psychoneurosis/psychotic/psychosomatic disorders.

Nature of Any Difference	Prepubertal				Postpubertal		Multiple Age Categories
				Childhood	Adolescent	Adult	
Males more				**NORTH AMERICA** *United States*: Gilbert 1957; Gove & Herb 1974*		**NORTH AMERICA** *United States*: Pollock 1925 (young & full)	**NORTH AMERICA** *United States*: Cloninger et al. 1978b:229
No signif. difference					**EUROPE** *Britain*: DL Smith 1996:1065		
Females more					**MIDDLE EAST** *Israel*: Margalit & Eysenck 1990 **NORTH AMERICA** *United States*: Douvan & Adelson 1966; Peskin 1972; Gove & Herb 1974*	**EUROPE** *Germany*: J Smith & M Baltes 1998 (elderly); *Sweden*: Klinteberg et al. 1987 (college) **LATIN AMERICA** *Mexico*: Langner 1965 **NORTH AMERICA** *Canada*: Engelsmann et al. 1972:154 (psychosomatic symptoms); *United States*: Srole et al. 1962; DC Leighton et al. 1963; Dohrenwend & Dohrendwend 1969; Koenig et al. 1990:129	**EUROPE** *Germany*: RD Gillespie 1942

5.8.1.7. Mental/Emotional Problems

Research undertaken to assess sex differences in people's tendencies to exhibit mental or emotional problems have largely concluded that females do so more than males (Table 5.8.1.7). The single exception was a study confined to suicide attempt victims, where no significant difference was identified.

Table 5.8.1.7. Mental/emotional problems.

Nature of Any Difference					Postpubertal		Multiple Age Categories
					Adolescent	Adult	
Males more							
No signif. difference							**NORTH AMERICA** *United States*: D Shaffer et al. 1996 (suicide attempt victims)
Females more					**NORTH AMERICA** *United States*: Gove & Herb 1974; Saunders et al. 1994	**EUROPE** *Netherlands*: Bijl et al. 1998 (minor psychiatric disorders); *Spain*: Vazquez-Barquero et al. 1992 (minor psychiatric disorders) **LATIN AMERICA** *Brazil*: da Silva Freire Coutinho et al. 1999 (minor psychiatric disorders) **NORTH AMERICA** *United States*: Briscoe 1982 (minor psychiatric disorders); R Jenkins 1985 (minor psychiatric disorders); Regier et al. 1988 (minor psychiatric disorders)	**EUROPE** *Finland*: Marttunen et al. 1995 (suicide attempt victims)

5.8.1.8. Internalizing Behavior

Under a variety of circumstances, the tendency to withdraw and look toward oneself when disturbed (as opposed toward acting out, as discussed immediately below) seems to be more characteristic of females than of males (Table 5.8.1.8; also see Rosenfield 2000).

Table 5.8.1.8. Internalizing behavior.

Nature of Any Difference	Prepubertal				Postpubertal		Multiple Age Categories
				Childhood	Adolescent	Adult	
Males more							
No signif. difference							
Females more				**NORTH AMERICA** *United States*: Keiley et al. 2000	**LATIN AMERICA** *Brazil*: Andrade et al. 2004 (delinquents) **NORTH AMERICA** *United States*: Schwab-Stone et al. 1995 (after experiencing violence); Schwab-Stone et al. 1999 (after experiencing interpersonal violence)	**NORTH AMERICA** *United States*: Luthar et al. 1996 (more internalizing disorders, opioid abusers)	**NORTH AMERICA** *United States*: EF Walker et al. 1995

5.8.1.9. Externalizing Behavior

The term *externalizing behavior* refers to a variety of symptoms that are all focused around individuals who are easily frustrated in social relationships and often manifest this frustration by behaving combatively toward others. Conduct disorders and antisocial personality are often considered some of the more extreme manifestations of externalizing behavior. All research has found that externalizing behavior is more prevalent among males than among females (Table 5.8.1.9; also see review by Rosenfield 2000).

Table 5.8.1.9. Externalizing behavior.

Nature of Any Difference	Prepubertal		Adolescent & Adult	
	Early Childhood	Childhood	Adolescent	Adult
Males more	**ASIA** *Hong Kong*: Luk et al. 1991 **EUROPE** *Netherlands*: Koot & Verhulst 1991 **NORTH AMERICA** *United States*: SL Rose et al. 1989; Pianta & Caldwell 1990; PJ Turner 1991; Stallard 1993; Gjone et al. 1996a; Lavigne et al. 1996	**EUROPE** *Netherlands*: Orlebeke et al. 1999 **NORTH AMERICA** *United States*: H Davidson & Lang 1960 (teacher rating); Bentzen 1963; Masten et al. 1990; EM Cummings et al. 1994a; Deater-Deckard et al. 1998; Crick et al. 1999; Hodges et al. 1999 Keiley et al. 2000 **INTERNATIONAL** *Multiple Countries*: Crijnen et al. 1999	**NORTH AMERICA** *United States*: Zaslow & Hayes 1986; Zaslow 1989; Schwab-Stone et al. 1995 (after experiencing violence); Hewitt et al. 1997; Schwab-Stone et al. 1999 (after experiencing interpersonal violence)	**NORTH AMERICA** *United States*: EF Walker et al. 1995; Barriga et al. 2001:551 (college) **INTER-NATIONAL** *Multiple Countries*: Crijnen et al. 1997
No signif. difference	**NORTH AMERICA** *United States*: Cornely & Bromet 1986; Newth & Corbett 1993 (East Asians) **OCEANIA** *New Zealand*: Pavuluri & Luk 1996			
Females more				

5.8.1.10. Genetic Influences on Conduct Disorder and Antisocial/Criminal Behavior

Numerous twin and adoption studies have implicated genetic factors in antisocial behavior as well as related behavior patterns such as persistent criminality (Ellis & Walsh 2000; Moffitt et al. 2001). Table 5.8.1.10 shows that most studies that have considered sex differences in such genetic influences have concluded that these effects are stronger in the case of males than for females.

Table 5.8.1.10. Genetic influences on conduct disorders and antisocial/criminal behavior.

Nature of Any Difference	Prepubertal		Postpubertal	
	Early Childhood	Childhood	Adolescent	Adult
More for males		**NORTH AMERICA** *United States*: JL Silberg et al. 1994 (externalizing behavior)	**NORTH AMERICA** *United States*: DC Rowe et al. 1995 (delinquency)	**NORTH AMERICA** *United States*: R Eme 1979:591 (young)
No signif. difference	**NORTH AMERICA** *United States*: Gjone et al. 1996a (conduct disorder)	**NORTH AMERICA** *United States*: Cadoret et al. 1995b (conduct disorder)		
More for females				

5.8.2. Negative Mood Disorders

Sex differences in disorders in which primary symptoms involve feelings of sadness and despair are discussed below.

5.8.2.1. General Depression (Affective Disorders), Self-Diagnosed (Prepubertal)

Due to the enormity of research pertaining to self-diagnosed depression, the citations are presented in several split-tables according to different age groups. Self-reported depression is usually provided on a questionnaire, either involving subjects providing responses to a single scale in which they rate their degrees of depression, or by asking them to answer several questions that are combined into a multi-item scale of depression. In the case of children, self-reported depression often involves collaborative information being obtained from parents or teachers.

As shown in Split-Table 5.8.2.1a, the findings for prepubertals are mixed, with most studies suggesting that no gender difference exists and the remaining studies almost equally divided between those suggesting that depression is more common among males or females.

Split-Table 5.8.2.1a. General depression (affective disorders), self-diagnosed (prepubertal).

Nature of Any Difference	Prepubertal			
			Early Childhood	Childhood
Males more				**NORTH AMERICA** *United States*: Kashani et al. 1982; AJ Finch et al. 1985; Smucker et al. 1986*; JC Anderson et al. 1987*; Doerfler et al. 1988*; EJ Costello et al. 1988; Puig-Antich 1989; Fendrich et al. 1991; Forehand et al. 1991a; Nolen-Hoeksema et al. 1991; Biederman et al. 2002 (ADHD patients)
No signif. difference			**NORTH AMERICA** *United States*: P Cohen et al. 1993a*	**EUROPE** *Britain*: Ollendick & Yule 1990; Fundudis et al. 1991; Angold & Rutter 1992; *Norway*: Wichstrom 1999 (older) **LATIN AMERICA** *Puerto Rico*: HR Bird et al. 1988 **NORTH AMERICA** *Canada*: JE Fleming et al. 1989; PS Links et al. 1989; Jacques & Mash 2004; *United States*: RH Jacobsen et al. 1983; Kashani et al. 1983; Kaslow et al. 1984; Saylor et al. 1984; SH Blumberg & Izard 1985; Mullins et al. 1985; WH Reynolds et al. 1985; Beck & Rosenberg 1986; Blechman et al. 1986; SH Blumberg & Izard 1986; Birleson et al. 1987; P Cohen & Brook 1987; Finchan et al. 1987; Mokros et al. 1987; Weisz et al. 1987; ED Altmann & Gothib 1988; Bodiford et al. 1988; RT Brown et al. 1988; Doerfler et al. 1988*; SS Feldman et al. 1988; Fristad et al. 1988; L Gates et al. 1988; D Knight et al. 1988; Weissman et al. 1988*; Wierzbicki & McCabe 1988; E Kennedy et al. 1989; WH Reynolds & Graves 1989; CJ Robins & Hinkley 1989; Velez et al. 1989; DA Cole & Carpentieri 1990; K Hodges 1990; Kashani et al. 1990; RW Larson et al. 1990; Nolen-Hoeksema et al. 1991; Edelsohn et al. 1992; Quiggle et al. 1992; Ruble et al. 1993; L Koenig et al. 1994
Females more			**NORTH AMERICA** *United States*: Downey & Walker 1992	**EUROPE** *Britain*: Martikainen et al. 2003:720; *Sweden*: Larsson & Melin 1992 (older) **NORTH AMERICA** *Canada*: Stavrakki et al. 1991; *United States*: Kovacs et al. 1984; Seligman et al. 1984; WM Reynolds et al. 1985; Leitenberg et al. 1986*; Worchel et al. 1987; Heft et al. 1988 (behavioral stress symptoms); Worchel et al. 1990a; Worchel et al. 1990b; MG Magnussen 1991; Boggiano & Barrett 1992 **OCEANIA** *Australia*: HI Bath & Middleton 1985*; Tisher et al. 1992

Regarding adolescents, Split-Table 5.8.2.1b shows that most studies report that females self-report experiencing depression to a greater degree than males. Nevertheless, a substantial number of studies report no significant gender differences in this regard.

Split-Table 5.8.2.1b. General depression (affective disorders), self-diagnosed (adolescents).

Nature of Any Difference	Postpubertal
	Adolescent
Males more	
No signif. differ.	**EUROPE** *Britain*: Parry-Jones 1989; *Scotland*: Sweeting & West 2003 (young) **NORTH AMERICA** *United States*: Friedrich et al. 1982; Baron & Joly 1988; ID Harris & Howard 1987; Doerfler et al. 1988*; J Mitchell et al. 1988; Stapley & Haviland 1989; Allgood-Merten et al. 1990; A Petersen et al. 1991; Lewinsohn et al. 1993; P Cohen et al. 1993a; J Jolly et al. 1994 (mental patients); R Casper et al. 1996; Schonert-Reichl 1994; Angold et al. 1998; Vega et al. 1998a* (Mexican Americans) **OCEANIA** *Australia*: AS Mark et al. 2004* (neuroticism controlled);G Martin et al. 2004:496 **INTERNATIONAL** *Multiple countries*: Abdel-Khalek & Soliman 1999
Females more	**ASIA** *China*: Hu 1994; Liu et al. 1999; Hesketch et al. 2002 **EUROPE** *Bulgaria*: BM Byrne et al. 1996 (HS); *Britain*: M Rutter 1985; *Germany*: Seiffge-Krenke & Stemmler 2002:411; *Norway*: Wichstrom 1999 **LATIN AMERICA** *Argentina*: Facia & Batistuta 2001 **NORTH AMERICA** *Canada*: D'Arcy & Siddique 1984; Bland et al. 1988*; Marcotte et al. 1999:39 (French-speaking); Aube et al. 2000:304; *United States*: Trumbull 1953 (survey); N Albert & Beck 1975; Burke & Weir 1978; Paton & Kandel 1978 (drug users); DB Kandel & Davies 1982; L Teri 1982; P Baron & Perron 1986; DB Kandel & Davies 1986; Choquet & Menke 1987; ID Harris & Howard 1987; Kashani et al. 1987; Petti & Larson 1987; RG Simmons & Blyth 1987; Wethington et al. 1987; Newcomb et al. 1988 (drug users); Brooks-Gunn & Warren 1989; CZ Garrison et al. 1989; Robbins 1989 (drug users); Stapley & Haviland 1989; Allgood-Merten et al. 1990; R Roberts et al. 1990; Brooks-Gunn & Petersen 1991; CZ Garrison et al. 1991; Novacek et al. 1991 (drug users); AC Petersen et al. 1991; Avison & McAlpine 1992; CZ Garrison et al. 1992 (young); S Gore et al. 1992; P Cohen et al. 1993a*; Gladstone & Koenig 1994; Lewinsohn et al. 1994 (survey); Nolen-Hoeksema & Girgus 1994; Fichman et al. 1995 (young); Compas et al. 1997; Cicchetti & Toth 1998; Hankin et al. 1998; Kroenke & Spitzer 1998; Langhinrichsen-Rohling et al. 1998* (older); P Barron & Campbell 1999; Joiner et al. 1999a (college); Ohannessian et al. 1999; Finkelstein et al. 2001; Benjet & Hernandez-Guzman 2002 (Mexican American); Twenge & Nolen-Hoeksema 2002 (meta-analysis, Children's' Depression Inventory); Burrow et al. 2004:277 (adoptees) **OCEANIA** *Australia*: GC Patton et al. 1996; AS Mark et al. 2004*; *New Zealand*: Allison et al. 2001

Split-Table 5.8.2.1c indicates that self-diagnosed depression is more likely among women than among men, although again quite a number of studies have failed to report statistically significant differences. This evidence largely supports the conclusion derived from earlier reviews that women have at least a somewhat greater risk of experiencing depression than men (Nolen-Hoeksema 1987; Piccinelli & Wilkinson 2000).

Table 5.8.2.1c. General depression (affective disorders), self-diagnosed (adults).

Nature of Any Difference	Postpubertal
	Adult
Males more	**NORTH AMERICA** *United States*: Amenson & Lewinsohn 1981 (at least one depression episode)
No signif. differ.	**AFRICA** *Nigeria*: Leighton et al. 1963:1057 **EUROPE** *Britain*: Nazroo et al. 1997; Bebbington 1998 (self-reported); *Finland*: Salokangas et al. 1996; *Switzerland*: Angst et al. 1997 (community survey) **NORTH AMERICA** *Canada*: Engelsmann et al. 1972:154* (rural); Bland 1988* (elderly); Bonin et al. 2000:155* (young); *United States*: Hammen & Padesky 1977 (young); D Blazer & Williams 1980 (elderly); Ensel 1982 (elderly); Egeland & Hostettet 1983; Australian Bureau of Statistics 1998 (self-reported among Amish); JP Newman 1986; Wilhelm & Parker 1989; Burke et al. 1991 (elderly); DR Brown et al. 1992 (elderly, Blacks); Ochoa et al. 1992 (community survey); Romanoski et al. 1992; Iwamasa et al. 1998 (Japanese-Americans, elderly); Vega et al. 1998a* (Mexican Americans); Aranda et al. 2001 (Mexican Americans); JC Barefoot et al. 2001* (age 80 and above); KS Kendler et al. 2001 (Twin cities); Bogner & Gallo 2004 (depression symptoms, community sample) **OCEANIA** *Australia*: Hong & Grambower 1986 (college)
Females more	**ASIA** *Korea*: C Lee et al. 1990; *China*: K Chou & Chi 2000 (elderly, after death of a spouse); *Hong Kong*: J Woo et al. 1994 (elderly) **EUROPE** *Britain*: FM Martin et al. 1957; S Fisher & Hood 1988:315 (college); Bebbington et al. 1989; Annandale & Hunt 1990:35; Paykel 1991; Mellanby et al. 2000:384 (college); *Denmark*: Sorenson & Stromgren 1961; *Finland*: Lehtinen et al. 1990; Rajala et al. 1995; Isometsa et al. 1997; *France*: Lecomte 1996 (elderly); *Germany*: Angst & Mikola 1984 (self-reported); Wittchen et al. 1992; J Smith & M Baltes 1998 (elderly) **LATIN AMERICA** *Brazil*: Dressler et al. 1998b:436; *Mexico*: DC Leighton et al. 1963; Langner 1965; *Puerto Rico*: Canino et al. 1987 **MIDDLE EAST** *Iran*: Bash & Bash-Liechti 1974; Tashakkori & Thompson 1989:351 (young); *Saudi Arabia*: Daradkeh et al. 2002 **NORTH AMERICA** *Canada*: Engelsmann et al. 1972:154* (urban); Bland et al. 1988* (young/middle age); J Murphy 1990; Astbury & Cabral 2000; Bonin et al. 2000:155*; Y Lunsky 2003; Jacques & Mash 2004; *United States*: Langner & Michael 1963; Schuckit et al. 1969 (alcoholics); Radloff 1975:254; SJ Blatt et al. 1976 (young); Weissman & Klerman 1977a* (college); Pearlin & Schooler 1978; Quesada et al. 1978 (Southwestern); Weissman & Myers 1978a; Funabiki et al. 1980 (young); S Rosenfield 1980; Aneshensel et al. 1981; RE Roberts & O'Keefe 1981; Vernon & Roberts 1982; Clearly & Mechanic 1983 (married couples); CE Ross et al. 1983 (married couples); Hughes & Warner 1984 (college); LN Robins et al. 1984; Weissman et al. 1984; Warheit et al. 1985 (Mexican Americans); TE Webb & Van Devere 1985; Fitting et al. 1986 (elderly, spousal caregivers); Kandel & Davies 1986 (young); Mendes de Leon & Markides 1988 (Mexican Americans); Regier et al. 1988; Pruchno & Resch 1989 (elderly, spousal caregivers); Rosenfield 1989; Hagnell & Grasbeck 1990; Regier et al. 1990a; Stallones et al. 1990 (elderly); Williamson & Schultz 1990 (caregivers to the elderly); Boggiano & Barret 1991 (college); Blazer et al. 1991 (elderly); Fujita et al. 1991; Parks & Pilisuk 1991 (caregivers to elderly parent); Robins & Regier 1991 (community sample); Schultz & Williamson 1991 (caregivers to the elderly); Weissman et al. 1991; BH Green et al. 1992 (elderly); Tennstedt et al. 1992 (caregivers to the elderly); O Umberson et al. 1992 (elderly, after death of a spouse); RC Kessler et al. 1993; MM Weissman et al. 1993; Blazer et al. 1994; Ettinger et al. 1994 (elderly); LK George 1994 (elderly); Kessler et al. 1994a; Lutzsky & Knight 1994 (elderly, spousal caregivers); Mendes de Leon et al. 1994 (elderly); Nolen-Hoeksema & Birgus 1994:259 (questionnaire); Wilhelm & Parker 1994 (self-reported); Breslau et al. 1995; Kornstein et al. 1995; Gatz et al. 1996 (elderly); Mirowsky 1996; Wu & DeMaris 1996; HG Koenig et al. 1997 (elderly); Schectman et al. 1997; SA Black et al. 1998 (elderly, Mexican Americans); Langhinrichsen-Rohling et al. 1998* (young); Rose-Rego et al. 1998 (elderly, spousal caregivers); Wilhelm et al. 1998; Turk & Okifuji 1999 (elderly, cancer patients); LS Chen et al. 2000 (community sample); Klonoff et al. 2000 (survey, young); Kornstein 2000a; JJ Mann et al. 2000:733; JC Barefoot et al. 2001* (age 60 and below); JA Brommelhoff et al. 2004 (reported by family members) **OCEANIA** *Australia*: Australian Bureau of Statistics 1998 (self-reported); *New Zealand*: Joyce et al. 1990

In the case of studies of self-reported general depression among mix-age samples (which are usually adolescents and adults combined), the evidence largely supports the view that females experience depression more than do males (Table 5.8.2.1d).

Table 5.8.2.1d. General depression (affective disorders), self-diagnosed (multiple age categories).

Nature of Any Difference	Multiple Age Categories
Males more	
No signif. differ.	**ASIA** *China*: Lau et al. 1999 (ages 13-22) **EUROPE** *Britain*: Loewenthal et al. 1995:1057 (Jews)
Females more	**AFRICA** *South Africa*: Kane & Lowis 1999 (S.A.D.) **ASIA** *China*: Hwu et al. 1989 **EUROPE** *Britain*: GW Brown & Harris 1978; R Cochrane 1983; Paykel 1991; R Cochrane 1993; R Jenkins et al. 1997; *Finland*: Lindeman et al. 2000; *Iceland*: Juel-Nielson & Stromgren 1965; *Norway*: Tambs & Moum 1993:366; *Switzerland*: Ernst & Angst 1992 (survey) **LATIN AMERICA** *Puerto Rico*: Canino et al. 1987a **NORTH AMERICA** *Canada*: Offord et al. 1996; *United States*: Hinkle et al. 1960; Zola 1963; Noreik & Odeguard 1966; Kendell 1968; C Silverman 1968; Mayer-Gross et al. 1969; Lehmann 1971; Benfari et al. 1972; Schwab et al. 1973; Siessi et al. 1974; Comstock & Helsing 1976; Weissman & Klerman 1977a*; Chevron et al. 1978; Quesada et al. 1978; Aneshensel et al. 1981; Frerichs et al. 1981; S Davis 1982; SW Vernon & Roberts 1982; JL Fox 1984; JK Myers et al. 1984; LN Robins et al. 1984; Vega et al. 1984; Warheit et al. 1985 (Hispanics); Nolen-Hoeksema 1987; Weissman et al. 1988a*; Ryff 1989:1079; Coryell et al. 1991 (survey); Kessler et al. 1993 (survey); RJ Turner et al. 1995; Chatham et al. 1999:1159 (heroine addicts); W Maier et al. 1999; Cyranowski et al. 2000; Simoni-Wastila 2000:291 **OCEANIA** *New Zealand*: JE Wells et al. 1989; Hankin et al. 1998 **INTERNATIONAL** *Multiple Countries*: Weissman et al. 1993; Culbertson 1997; Ustun 2000

5.8.2.2. Depression/Unipolar Depression, Clinically Diagnosed Other than Bipolar

Clinically diagnosed depression is usually carried out by a psychologist or psychiatrist based on interviews and/or standardized questionnaires usually based on guidelines prescribed in the *Diagnostic and Statistical Manual*. Research indicates that there is a strong correlation between self-reported depression and clinically diagnosed depression (Wilcox et al. 1998). Excluded from the present table are all studies of bipolar depression since it will be considered in a subsequent table.

Due to the large number of studies, findings concerning gender differences in clinical depression are presented in split-tables. In Split-Table 5.8.2.2a, one can see that most studies of prepubertals have found no significant gender differences in rates of clinical depression. Where differences have been reported, they are almost equally divided between those suggesting that males have higher depression rates and those that report the opposite.

Split-Table 5.8.2.2a. Depression/unipolar depression, clinically diagnosed (prepubertal) (other than bipolar).

Nature of Any Difference	Prepubertal		
	Toddler	Early Childhood	Childhood
More in males		**EUROPE** *Britain*: Kolvin et al. 1991 **NORTH AMERICA** *United States*: Joshi et al. 1990	**NORTH AMERICA** *United States*: JC Anderson et al. 1987; Hankin et al. 1998*
No signif. difference	**NORTH AMERICA** *United States*: Kashani et al. 1986	**EUROPE** *Britain*: Angold & Rutter 1992 **NORTH AMERICA** *United States*: Kazdin et al. 1983a; Kazdin et al. 1985; Kazdin et al. 1986; Kazdin 1987; WM Nelson et al. 1987; Kazdin 1989; Kazdin 1990a	**EUROPE** *Britain*: J Pearce 1978a; *Finland*: Hankin & Abramson 1999* **NORTH AMERICA** *United States*: Peterson et al. 1991*; Angold & Rutter 1992*; Ge et al. 1994; Angold et al. 1998; Wichstrom 1999* **OCEANIA** *New Zealand*: Jorm 1987a*
More in females		**NORTH AMERICA** *Canada*: Offord et al. 1987* (adoptive families)	**NORTH AMERICA** *Canada*: Offord et al. 1987* (adoptive families); *United States*: Kazdin et al. 1983b; JD McLeod 1991* (following death of parent); Kendler et al. 2004

The picture changes substantially when attention is turned to adolescents (Split-Table 5.8.2.2b). For this age group, nearly all studies indicate that females are more often depressed than are males.

Split-Table 5.8.2.2b. Depression/unipolar depression, clinically diagnosed (adolescents) (other than bipolar).

Nature of Any Difference	Postpubertal
	Adolescent
More in males	**ASIA** *Japan*: Takakura & Sakihara 2001 (severe symptoms)
No signif. difference	
More in females	**ASIA** *Japan*: Takakura & Sakihara 2001 **EUROPE** *Britain*: Angold & Rutter 1992*; Harrington et al. 1990; *Finland*: Hankin & Abramson 1999*; *Norway*: Waaktaar et al. 2004; *Spain*: E Calvete & Cardenuso 2005; *Sweden*: Olsson & von Knorring 1999 **MIDDLE EAST** *Iran*: Valentine 1959; Mehryar & Shapurian 1970 **NORTH AMERICA** *Canada*: Offord et al. 1987* (adoptive families); Blatt 1993; Leadbeater et al. 1995; BL Hankin et al. 1998 (longitunal study); Statistics Canada 1999; Marcotte 2002; G Beauchamp & Gagnon 2004; Galambos et al. 2004; *United States*: Kashani et al. 1987; Garber et al. 1988; Allgood-Merten et al. 1990; Nolen-Hoeksema 1990; AC Peterson et al. 1990; Petersen et al. 1991*; Garrison et al. 1992; McGee et al. 1992 (young); Cohen et al. 1993; Lewinsohn et al. 1993; AC Petersen et al. 1993; Zahn-Waxler 1993; Blazer et al. 1994*; Ge et al. 1994; Lewinsohn et al. 1994b; Rao et al. 1995; DB Clark et al. 1997 (substance abusers); Hankin et al. 1997; Angold et al. 1998*; Hankin et al. 1998*; Hankin & Abramson 1999*; Silberg et al. 1999; Wichstrom 1999*; Grella et al. 2001 (substance abuse treatment clients); Hankin & Abramson 2002 (clinical interview); Stewart-Sabin & Chaffin 2002 (substance abuse treatment clients); Galambos et al. 2004; PB Repetto et al. 2004 (African-Americans); Stemmler & Petersen 2005:181* **OCEANIA** *New Zealand*: Hankin et al. 1998 **INTERNATIONAL** *Multiple Countries*: TJ Wade et al. 2002

For adults, Split-Table 5.8.2.2c shows that again most studies have found females being diagnosed with depression more than males, although a sizable proportion of the studies fail to have found the differences to be statistically significant.

Split-Table 5.8.2.2c. Depression/unipolar depression, clinically diagnosed (adults) (other than bipolar).

Nature of Any Difference	Postpubertal
	Adult
More in males	**AFRICA** *Guinea*: Collomb & Zwingelstein 1961 **ASIA** *India*: Venkoba 1966; Venkoba 1970; Teja 1971
No signif. difference	**AFRICA** *Egypt*: El-Islam 1969*; *Nigeria*: Leighton et al. 1963*; Ezeilo & Onyeama 1980*; *Rhodesia*: Buchan 1969 (Blacks) **ASIA** *Hong Kong*: Yap 1965 **EUROPE** *Britain*: Wainright & Surtees 2002* (elderly) **MIDDLE EAST** *Iran*: Bash & Bash-Liechti 1969 (rural); Makaremi 1989 (young); *Iraq*: Bazzoui 1970 **NORTH AMERICA** *United States*: Bornstein et al. 1973; Hammen & Padesky 1977 (young); Blazer & Williams 1980 (elderly); Stangler & Printz 1980* (young); Ensel 1982 (elderly); Egeland & Hostetter 1983 (Amish)(elderly); Bebbington et al. 1998* (elderly); Murtagh & Hubert 2004:1409 (elderly)
More in females	**AFRICA** *Kenya*: Vadher & Ndetei 1981; *Nigeria*: Ezeilo & Onyeama 1980; *Uganda*: Orley et al. 1979 **ASIA** *China*: Woo et al. 1994 (elderly)**;** *Japan*: Rin et al. 1973; *Taiwan*: Rin et al. 1973 **EUROPE** *Britain*: FM Martin et al. 1957*; Adelstein et al. 1964; Cooper et al. 1969; Weissman & Klerman 1977a*; G Dean 1981 et al. 1981*; J Archer & Lloyd 1985; Rorsman et al. 1990; C Power 1991:413 (young); Paykel 1991; Angold & Rutter 1992; Bebbington 1996*; Bebbington 1998; Bebbington 1999; *Czechoslovakia*: Weissman & Klerman 1977a*; *Denmark*: Juel-Nielson et al. 1961; Sorenson & Stromgren 1961a*; Weeke et al. 1975*; Weissman & Kleman 1977a*; *Finland*: Weissman & Klerman 1977a*; *France*: Weissman & Klerman 1977a*; Perugi et al. 1990*; *Germany*: Angst & Dobler-Mikola 1984; Ernst & Angst 1992; Wittchen et al. 1992; C Meyer et al. 2000; *Hungary*: F Margitics 2005 (college, intense symptoms); *Italy*: Perugi et al. 1990*; Gallo et al. 1993* (full & elderly); *Iceland*: Helgason 1961*; Helgason 1977*; *Netherlands*: Grewel 1967; Saenger 1968; *Norway*: Odegaard 1961; Weissman & Klerman 1977a*; Rutz 1996; *Poland*: Weissman & Klerman 1977a*; *Scotland*: JA Baldwin 1971* *Spain*: Zunzunegui et al. 1998 (elderly, working class); *Sweden*: Essen-Moeller 1956*; Essen-Moeller & Hagnell 1961; Weissman & Klerman 1977a*; S Takkinen et al. 2004 (elderly, non-same sex twins); *Switzerland*: Weissman & Klerman 1977a*; *Wales*: FM Martin et al. 1957* **MIDDLE EAST** *Iran*: Bash & Bash-Liechti 1974*; *Israel*: Halevi et al. 1969*; Gershon & Liebowitz 1975* **NORTH AMERICA** *Canada*: Canadian Bureau of Statistics 1970*; Weissman & Klerman 1977a*; Statistics Canada 1999; *United States*: Lemkau et al. 1942; Gardner et al. 1963; Duvall et al. 1966; SH Rosenthal 1966 (young & full); Tarnower & Humphries 1969; Rice & Kepecs 1970; Pederson et al. 1972; Blumenthal 1975; Radloff 1975 (young, full, & elderly); Faden 1977 (young & full); Weissman & Klerman 1977a*; Weissman & Myers 1978a; Rosenfield 1980; Stangler & Printz 1980* (young); Amenson & Lewinshon 1981; JH Boyd & Weissman 1981; PJ Clayton 1981; Eaton & Kessler 1981; Frerichs et al. 1981; Murrell et al. 1983 (elderly, symptoms); Williams & Spritzer 1983; JK Myers et al. 1984 (young, full, & elderly); LN Robins et al. 1984; Weissman et al. 1984; Blechman et al. 1986 (elderly); JR Turner & Avison 1987; Weissman 1987; E Frank et al. 1988*; Regier et al. 1988; Briones et al. 1990; MA Young et al. 1990a*; JD McLeod 1991* (following parental loss in childhood); Benishek et al. 1992 (among alcoholics); J Wallace & O'Hara 1992 (elderly); J Wallen 1992 (drug abusers); Dunne et al. 1993 (among premorbid alcoholics); L Fisher et al. 1993; Gallo et al. 1993*; Kessler et al. 1993; McCauley et al. 1993 (young); Blazer et al. 1994*; Bruce & Hoff 1994 (elderly); Kessler et al. 1994a*; Kessler et al. 1994b*; Kornstein et al. 1995*; Silverstein et al. 1995; Weissman & Olfson 1995; JB Williams et al. 1995; Wolk & Weissman 1995; Bebbington 1996*; AV Horwitz et al. 1996 (young); Weissman et al. 1996; Nazroo et al. 1997; Weissman & Klerman 1997a*; Angold et al. 1998*; Bebbington et al. 1998*; Kendler & Prescott 1999; Benazzi 1999; Silverstein 1999; KM Carpenter et al. 2000 (obese persons); Kornstein et al. 2000a; MJ Burns et al. 2001 (elderly); EB Blanchard et al. 2001 (IBS patients); Fanous et al. 2002 (twins); Kendler et al. 2002 (following parental loss in childhood); Sanathara et al. 2003; Tabenkin et al. 2004; Stemmler & Petersen 2005:181* (young) **OCEANIA** *Australia*: Castle et al. 1995 (OCD patients); RD Goldney & Fisher 2004 (combination of major depression and dysthymia); *New Zealand*: Jorm 1987a* **INTERNATIONAL** *Multiple Countries*: Ernst & Angst 1992; Weissman et al. 1996

In the case of multiple-age subjects (nearly always adolescents and adults combined), the evidence largely indicates that females are more often diagnosed as being unipolarly depressed than is true for males (Split-Table 5.8.2.2d).

Split-Table 5.8.2.2d. Depression/unipolar depression, clinically diagnosed other than bipolar (multiple age categories).

Nature of Any Difference			Multiple Age Categories
More in males			**AFRICA** *Uganda*: Orley 1972
No signif. difference			**AFRICA** *Egypt*: El-Islam 1969*; *Nigeria*: Leighton et al. 1963*; Ezeilo & Onyeama 1980*; *South Africa*: Buchan 1969; *Uganda*: Orley et al. 1979 **ASIA** *Thailand*: Tongyonk 1971 **MIDDLE EAST** *Iran*: Bash & Bash-Liechti 1974* (rural)
More in females			**AFRICA** *Kenya*: Vadher & Ndetei 1981 **ASIA** *India*: Nandi 1977 (rural); Nandi et al. 1979:286 **EUROPE** *Britain*: FM Martin et al. 1957*; GW Brown & Harris 1978; G Dean et al. 1981*; Tennant 1985; Noshirvani et al. 1991 (OCD patients); Wainwright & Surtees 2002*; *Denmark*: Sorenson & Stromgren 1961a*; A Weeke et al. 1975*; *Germany*: Dilling et al. 1988; Fichter 1990; Maier et al. 1992; *Greece*: Koutrelakos et al. 1999*; *Iceland*: Helgason 1961*; Helgason 1977*; *Ireland*: M Clarke et al. 1998:355 (unipolar); *Italy*: Perugi et al. 1990; Benazzi 2000; *Scotland*: JA Baldwin 1971*; *Sweden*: Essen-Moeller 1956*; Essen-Moeller & Hagnell 1961; *Switzerland*: Kielholz 1959 **MIDDLE EAST** *Iran*: KW Bash & Bash-Liechti 1974* (urban); *Israel*: Halevi et al. 1969*; Gershon & Liebowitz 1975* **NORTH AMERICA** *Canada*: Canadian Bureau of Statistics 1970*; Walters et al. 2002:678; *United States*: M Cooper et al. 1942; Weschler 1961; US Dept. of Health Education and Welfare 1970; Paykel & Dienelt 1971; Celesia & Wanamaker 1972 (Parkinson's patients); Pederson et al. 1972; Cannon & Redick 1973; Weissman & Klerman 1977a*; Scarf 1979; Arieti & Bemporad 1980; Neff & Husaini 1980:18; Stangler & Printz 1980*; Gotham et al. 1986 (Parkinson's patients); Bebbington 1988; E Frank et al. 1988*; JG Linn et al. 1989 (Blacks); E McGrath et al. 1990; Sargeant et al. 1990; MA Young et al. 1990a*; Angold & Rutter 1992*; Coryell et al. 1992; Korff et al. 1992; Weissman et al. 1992; Moldin et al. 1993; Weissman et al. 1993; Kessler et al. 1994a*; Kessler et al. 1994b*; Kornstein et al. 1995*; R Brown & B MacCarthy 1990 (Parkinson's patients); Kessler et al. 1993; Mirowsky 1996; Culbertson 1997; Kornstein 1997; HB Simpson et al. 1997; Koutrelakos et al. 1999*; Cyranowski et al. 2000; Latimer et al. 2002 (substance abusers) **OCEANIA** *Australia*: Krupinski & Stoller 1962; Byrne 1980; Berah 1983; H Christensen et al. 1999:331; *New Zealand*: Christie 1968 **INTERNATIONAL** *Multiple Countries*: Lehmann 1971; K Singer 1975; Weissman & Klerman 1977a* (11 Western countries); Maier et al. 1999:244

5.8.2.3. Multiple Episodes of Depression

Table 5.8.2.3 summarizes findings concerning sex differences in the degree to which clinically diagnosed episodes of depression reoccur. The studies have all concluded that there is either no difference or that females are more likely than males to have recurring episodes.

Table 5.8.2.3. Multiple episodes of depression.

Nature of Any Difference							Multiple Age Categories
More in males							
No signif. difference							**EUROPE** *Italy*: Benazzi 2000 **NORTH AMERICA** *United States*: Coryell et al. 1991; Kessler et al. 1993; Winokur et al. 1993; HB Simpson et al. 1997
More in females							**EUROPE** *Italy*: Perugi et al. 1990; *Switzerland*: Ernst & Angst 1992 **NORTH AMERICA** *United States*: Lewinsohn et al. 1989; Pajer 1995; Kornstein 1997; Lewinsohn et al. 1993

5.8.2.4. Age of Onset of Depression

Most of the studies in Table 5.8.2.4 used clinically diagnosed depression and reported on the age of onset of the first episode. These studies have concluded that either there was no significant difference or that females have an earlier age of onset relative to males.

Table 5.8.2.4. Age of onset of depression.

Nature of Any Difference	Citations
Earlier for males	
No signif. Difference	**EUROPE** *Italy*: Perugi et al. 1990; Benazzi 2000; *Sweden*: Hagnell et al. 1982 **NORTH AMERICA** *United States*: Klerman et al. 1965; Lewinsohn et al. 1986; Weissman et al. 1988; Kornstein 1997; Hayward et al. 1999* (Whites, pre-puberty); Hayward et al. 1999* (Hispanics & Blacks, pre & post-puberty)
Earlier for females	**EUROPE** *Germany*: Jung 1952; Hertrich 1962; Matussek et al. 1965 **NORTH AMERICA** *United States*: Klerman & Weissman 1989; Ge et al. 1994; Lewinsohn et al. 1994a; Nolen-Hoeksem & Girgus 1994; Pajer 1995; Hayward et al. 1999* (Whites, post-puberty)

5.8.2.5. Severity of Depression

A few studies have compared males and females with clinical depression with respect to the severity of their symptomology. As shown in Table 5.8.2.5, the findings have been somewhat mixed, although all studies that have reported significant differences have concluded that symptoms are more severe in females than in males.

Table 5.8.2.5. Severity of depression.

Nature of Any Difference					Postpubertal		Multiple Age Categories
						Adult	
More severe in males							
No signif. difference							**NORTH AMERICA** *United States*: E Frank et al. 1988; MA Young et al. 1990; Zlotnick et al. 1996; HB Simpson et al. 1997
More severe in females						**NORTH AMERICA** *United States*: McCauley et al. 1993 (young)	**NORTH AMERICA** *United States*: Lewinsohn et al. 1989; Kornstein et al. 1995

5.8.2.6. Association Between Depression and Anxiety

Three studies have indicated that feelings of anxiety are more common among depressed females than among depressed males, while a fourth study reported the opposite pattern (Table 5.8.2.6).

Table 5.8.2.6. Association between depression and anxiety.

Nature of Any Difference					Postpubertal	
						Adult
More in males						**NORTH AMERICA** *United States*: VM Simonds & Whiffen 2003
No signif. difference						
More in females						**NORTH AMERICA** *United States*: Breslau et al. 1995; MH Rapaport et al. 1995; Kornstein 1997

5.8.2.7. Association Between Depression and Poor Physical Health

Most research regarding any gender differences in physical health among persons suffering from depression has found a stronger connection between depression and poor health among males than among females (Table 5.8.2.7).

Table 5.8.2.7. Association between depression and poor physical health.

Nature of Any Difference					Postpubertal	
						Adult
More in males						**EUROPE** *Netherlands*: Beekman et al. 1995 (elderly); Beekman et al. 1995b (elderly); *Sweden*: Bergh et al. 2003 (elderly, chronic pain) **NORTH AMERICA** *United States*: Cadoret & Widmer 1988 (elderly)
No signif. difference						
More in females						**EUROPE** *Norway*: Bjerkeset et al. 2005 (following myocardial infarction)

5.8.2.8. Association Between Depression and Pain Disorders

Research has indicated that females exhibit a stronger association between feelings of depression and manifesting pain disorders than is true for males (Table 5.8.2.8).

Table 5.8.2.8. Association between depression and pain disorders.

Nature of Any Difference					Postpubertal	
						Adult
Stronger in males						
No signif. difference						
Stronger in females						**NORTH AMERICA** *United States*: Fishbain et al. 1986; Magni et al. 1990; Magni et al. 1994

5.8.2.9. Association Between Depression and Anger Suppression

As shown in Table 5.8.2.9, one study found that the association between depression and people's tendency to suppress their anger is stronger for females than for males.

Table 5.8.2.9. Association between depression and anger suppression.

Nature of Any Difference					Postpubertal	
						Adult
Stronger in males						
No signif. difference						
Stronger in females						**NORTH AMERICA** *United States*: JL Newman et al. 1999

5.8.2.10. Association Between Depression and Lack of Social Support

According to two studies, females exhibit a stronger association than males do between symptoms of depression and a lack of social support from others (Table 5.8.2.10).

Table 5.8.2.10. Association between depression and lack of social support.

Nature of Any Difference					Postpubertal	
						Adult
Stronger in males						
No signif. difference						
Stronger in females						**NORTH AMERICA** *United States*: Brugha et al. 1990; Slavin & Rainer 1990

5.8.2.11. Subjective Explanations for Depression

A couple of studies of persons with depression have asked them what factors they felt were most important in bringing them to a depressive state. As shown in Table 5.8.2.11, females were more likely than males to attribute their depression to interpersonal problems.

Table 5.8.2.11. Subjective explanations for depression.

Nature of Any Difference					Postpubertal	
						Adult
More in males						
No signif. difference						**ASIA** *China*: L Li et al. 2005 (after death of a spouse, panel study)
More in females						**NORTH AMERICA** *United States*: Robbins & Tanck 1991 (attributed to interpersonal problems); Spangler et al. 1996 (attributed to interpersonal problems)

5.8.2.12. Bipolar (Manic) Depression

Bipolar or manic depression is typified by dramatic mood swings. At one extreme, individuals are extremely energetic and sociable (the manic phase), while a few weeks or months later they may be so depressed that they spend days on end isolated from others. Overall, the research surrounding bipolar depression has reached inconsistent conclusions regarding the possibility of any significant gender differences (Table 5.8.2.12).

Table 5.8.2.12. Bipolar (manic) depression.

Nature of Any Difference					Postpubertal		Multiple Age Categories
					Adolescent	Adult	
Males more						**EUROPE** *Hungary*: Szadoczky et al. 1998 (manic episode) **NORTH AMERICA** *Canada*: Fogarty et al. 1994 (manic episode)	**EUROPE** *Denmark*: Nielsen & Bion-Henriksen 1979 **NORTH AMERICA** *United States*: Egeland et al. 1983
No signif. difference						**AFRICA** *Ethiopia*: Kebede & Alem 1999 (urban) **ASIA** *Korea*: CK Lee et al. 1990 (community sample) **EUROPE** *Britain*: Spicer et al. 1973 (clinical sample); Leff et al. 1976 (clinical sample); Der & Bebbington 1987 (clinical sample); *Denmark*: Weeke et al. 1975 (clinical sample); Weeke 1984 (clinical sample); *Greenland*: Lynge et al. 1999 (clinical sample); *Hungary*: Szadoczky et al. 1998; *Ireland*: M Clarke et al. 1998:355; *Norway*: Kringlen et al. 2001 (community sample) **LATIN AMERICA** *Puerto Rico*: Canino et al. 1987 **MIDDLE EAST** *Israel*: Levav et al. 1993 (young) **NORTH AMERICA** *Canada*: Bland et al. 1988 (urban); Fogarty et al. 1994; *United States*: Weissman & Myers 1978 (urban community sample); Nielsen & Nielsen 1979 (clinical sample); Egeland & Hostetter 1983 (Amish); Weissman et al 1984; Regier et al. 1988 (community sample); Weissman et al. 1988 **OCEANIA** *New Zealand*: Oakley-Browne et al. 1989 (community sample); JE Wells et al. 1989	**EUROPE** *Britain*: Spicer et al. 1973; I Daly et al. 1995 (clinical sample); *Denmark*: Leff et al. 1976; *Iceland*: Stefansson et al. 1991 (community sample) **NORTH AMERICA** *United States*: Rosen et al. 1961; Kessler et al. 1997
Females more					**EUROPE** *Sweden*: Olsson & von Knorring 1999:329 **NORTH AMERICA** *United States*: Lewinsohn et al. 1993; Lewinsohn et al. 1995	**EUROPE** *France*: Akiskal et al. 1998; *Iceland*: Helgason 1977 (clinical sample) **NORTH AMERICA** *United States*: Pollock 1925; Clayton 1981; Lewinsohn et al. 1986 (young); Tondo & Baldessarini 1998; Unutzer et al. 1998 (clinical sample)	**ASIA** *India*: Dube & Kumar 1973 **EUROPE** *Denmark*: A DuPont et al. 1974; Weeke et al. 1975; *Iceland*: Helgason 1979 **NORTH AMERICA** *United States*: Weissman et al. 1988a

5.8.2.13. Age of Onset of Bipolar (Manic) Depression

Table 5.8.2.13 cites the studies that have sought to determine if a sex difference exists in the age of onset of manic-depression. It indicates that there is no clear-cut difference.

Table 5.8.2.13. Age of onset of bipolar (manic) depression.

Nature of Any Difference	Citations
Males earlier	**EUROPE** *Germany*: Angermeyer & Robra 1982
No signif. difference	**EUROPE** *Britain*: McCabe 1975; *Germany*: Rehm 1919; Slater 1938; Auch 1962; *Iceland*: Helgason 1964 **NORTH AMERICA** *Canada*: Flor-Henry 1974; RC Bland 1977; *United States*: Wertham 1929; Hardt 1959
Females earlier	**EUROPE** *Germany*: Schulz 1951; Angst 1966 **NORTH AMERICA** *United States*: Faris & Dunham 1939

5.8.2.14. Cycling in Manic Depression

The phenomenon of cycling in manic depression refers to the rapidity with which individuals with manic depression oscillate between the manic and the depressive states of the illness. As shown in Table 5.8.2.14, several studies found females cycling more often on average than males.

Table 5.8.2.14. Cycling in manic depression.

Nature of Any Difference	Citations
Males more	
No signif. difference	
Females more	**ASIA** *India*: Avasthi et al. 1999 **EUROPE** *Britain*: Perugi et al. 1990 (adult females in the depressed phase of bipolar disorder more); Angst. 1978 (females in the depressed phase of bipolar disorder more) **NORTH AMERICA** *United States*: Rasgon et al. 2005 (adult females in the depressed phase of bipolar disorder more); Angst 1978 (adult females in the depressed phase of bipolar disorder more)

5.8.2.15. Depression/Behavioral Disturbances in Response to Parental Divorce/Discord

Table 5.8.2.15 suggests that prior to adulthood, males are more likely than females to exhibit behavioral problems following divorce of their parents, whereas in adulthood, the opposite may be the case.

Table 5.8.2.15. Depression/behavioral disturbances in response to parental divorce/discord.

Nature of Any Dif-ference	Prepubertal	Postpubertal	
	Early Childhood	Adolescent	Adult
Males more	**NORTH AMERICA** *United States***:** EM Hetherington et al. 1979	**NORTH AMERICA** *United States*: JH Block et al. 1986; Dornbusch et al. 1987 (grades)	
No signif. difference			
Females more			**NORTH AMERICA** *United States*: Rodgers 1994 (following parental divorce)

5.8.2.16. Ruminating Over Negative Emotional Experiences

Rumination refers to the inability to stop thinking about something troubling. Ruminating over problems is thought to be an aggravating factor in depression. As Table 5.8.2.16 shows, females are consistently more likely than males to ruminate over negative emotional experiences.

Table 5.8.2.16. Ruminating over negative emotional experiences.

Nature of Any Dif-ference	Postpubertal		Multiple Age Categories
	Adolescent	Adult	
Males more			
No signif. difference			
Females more	**ASIA** *India*: Singh-Manoux 2000:98* **EUROPE** *Britain*: Singh-Manoux 2000:98* **NORTH AMERICA** *United States*: Compas et al. 1988; Nolen-Hoeksema et al. 1994; JA Schwartz & Koenig 1996*; BI Hart & Thompson 1997; Nolen-Hoeksema & Rusting 1999; AJ Rose 2002 (co-ruminate)	**EUROPE** *France*: Rime et al. 1992 (young) **NORTH AMERICA** *United States*: Kleinke et al. 1982 (young); Ingram et al. 1988 (young & full); Carver et al. 1989; Snell et al. 1989; Bruder-Mattson & Hovanitz 1990 (depressed); Nolen-Hoeksema et al. 1993* (young); LD Butler & Nolen-Hoeksema 1994 (college); K Sidmore 1999 (sad experiences); Brody 2001:55 (sad experiences) **INTERNATIONAL** *Multiple Countries*: Eshun et al. 1998:582 (Ghana, Africa, & US)	**NORTH AMERICA** *United States*: Nolen-Hoeksema et al. 1993*; Schwartz & Koening 1996*

5.8.2.17. Depression in Addition to Bulimia or Anorexia Nervosa

Some people with eating disorders such as bulimia (usually, binging and then purging) or anorexia nervosa (self-induced starvation because of fear of fat) suffer from depression. According to Table 5.8.2.17, this is more likely to occur in females than in males.

Table 5.8.2.17. Depression in addition to bulimia or anorexia nervosa.

Nature of Any Dif-ference	Postpubertal
	Adult
Males more	
No signif. difference	
Females more	**NORTH AMERICA** *United States*: Fava et al. 1996; J Carter et al. 1999

5.8.2.18. Depression Accompanying Substance Abuse

Research undertaken to determine which gender is more likely to be both depressed and to abuse drugs or alcohol have concluded that this is more characteristic of females than of males (Table 5.8.2.18).

Table 5.8.2.18. Depression accompanying to substance abuse.

Nature of Any Difference	Postpubertal	
	Adolescent	Adult
Males more		
No signif. difference		
Females more	**NORTH AMERICA** *United States*: Pope et al. 1994:359 (alcohol)	**NORTH AMERICA** *United States*: Hser et al. 1987; ML Griffin et al. 1989 (cocaine); Benishek et al. 1992; P Brennan et al. 1993 (elderly); Inciardi et al. 1993 (crack cocaine); Fava et al. 1996; J Carter et al. 1999; Langan & Pelissier 2001 (prisoners)

5.8.2.19. Consistency Between Self-Reported Depression & Clinically Diagnosed Depression

A few studies have sought to determine if any gender differences exist in the degree to which self-reported depression corresponds to clinically diagnosed depression. They have all concluded that female patients exhibit significantly higher degrees of consistency than do male patients (Table 5.8.2.19).

Table 5.8.2.19. Consistency between self-reported depression & clinically diagnosed depression.

Nature of Any Difference	Postpubertal
	Adolescent
Higher among males	
No signif. difference	
Higher among females	**NORTH AMERICA** *United States*: DR Robbins et al. 1985; Shain et al. 1990; Ambrosini et al. 1991 (mental patients); JB Jolly et al. 1994 (mental patients)

5.8.3. Schizophrenia

Schizophrenia is a common form of mental illness. Among its symptoms are the hearing of voices and irrational paranoia. Extreme forms of the disease often result in catatonia, a state in which the body tends to retain a rigid position.

5.8.3.1. Schizophrenia in General

Table 5.8.3.1 tabulates the incidence of diagnosed schizophrenia in males and females. Most research has found a higher incidence in males.

Table 5.8.3.1. Schizophrenia in general.

Nature of Any Difference	Postpubertal	Multiple Age Categories
	Adult	
More in males	**ASIA** *Soviet Union*: Holland & Shakhmatova-Pavlova 1977 **EUROPE** *Britain*: DJ Castle et al. 1993 (young & full); *Spain*: Usall et al. 2003 (re-occurrence rate) **NORTH AMERICA** *United States*: Wittenborn 1951; Gross 1959; Cheek 1964; Wittenborn 1964; Wittenborn & Smith 1964; Weich 1968; J Goldstein 1988 (severity); J Goldstein 1988 (re-occurrence); Andreasen et al. 1990 (neurological symptoms); J Flaum et al. 1990 (neurological symptoms); Goldstein et al. 1990; Test et al. 1990 (re-occurence); DJ Castle et al. 1991; Iacono & Beiser 1992; Swayze et al. 1992 (neurological symptoms); Waddington 1993 (neurological symptoms); KS Kendler & Walsh 1995; Doering et al. 1998 (re-occurence) **INTERNATIONAL** *Multiple Countries*: World Health Organization 1973	**ASIA** *India*: Nandi et al. 1979:286; Sethi & Manchandaa 1980:201; Gangadhar et al. 2002:318; *Japan*: Shimizu et al. 1988 *Korea*: CK Lee et al. 1990 **EUROPE** *Britain*: JE Cooper et al. 1987; Stromgen 1987; D Castle et al. 1991; Ring et al. 1991; Nicole et al. 1992; DJ Castle et al. 1993; Goldacre et al. 1994; Galdos & van Os 1995* (serious diagnosed symptoms); Kendler & Walsh 1995; *Denmark*: Munk-Jorgensen 1986; Schelin et al. 2000; *Finland*: Rantakallio 1988; TD Cannon et al. 1998; Rasanen et al. 1999; *Germany*: Hafner et al. 1989 *Ireland*: Ni Nullain et al. 1987 **NORTH AMERICA** *Canada*: Bland 1984; Wattie & Kedward 1985; G Beauchamp & Gagnon 2004; *United States*: Iacono & Beiser 1992; Beiser et al. 1993; Lewine et al. 1984 **INTERNATIONAL** *Multiple Countries*: Sartorius et al. 1986
No signif. difference	**EUROPE** *Spain*: Vazquez-Barquero et al. 1995 (prevalence)	**EUROPE** *Croatia*: Folnegovic & Folnegovic-Smalc 1994; *Germany*: Hafner et al. 1994; Hambrecht et al. 1994; *Italy*: De Salvia et al. 1993; *Multiple European Countries*: Salokangas 1993 **NORTH AMERICA** *United States*: Dohrenwend & Dohrenwend 1976:1453; Eme 1979:591; Van Kammen & Sternberg 1980:719; Robins et al. 1984; Hafner et al. 1989
More in females		**EUROPE** *Britain*: Galdos & van Os 1995* (retrospective self-reports)

5.8.3.2. Schizophrenia or Schizotypical Personality Disorder Among Relatives of Schizophrenics

Table 5.8.3.2 looks at the rate of "genetic load" among relatives of schizophrenics, addressing the issue of whether genes might be more involved in one sex or the other in the development of schizophrenia. These studies indicate that for those with this mental condition, genetic factors are making a greater contribution to schizophrenia and schizophrenia-like symptoms among females than among males.

Table 5.8.3.2. Schizophrenia or schizotypical personality disorder among relatives of schizophrenics.

Nature of Any Difference	Postpubertal		Multiple Age Categories
		Adult	
Males more			
No signif. difference			
Females more		**NORTH AMERICA** *United States*: Magharious et al. 1998	**ASIA** *Japan*: Shimuzu et al. 1987 **EUROPE** *Britain*: Sham et al. 1994; *Germany*: Maier et al. 1993a **NORTH AMERICA** *United States*: JM Goldstein et al. 1989; JM Goldstein et al. 1990a; Pulver et al. 1990; JM Goldstein et al. 1992; Wolyniec et al. 1992

5.8.3.3. Age of Onset of Schizophrenia (Diagnosis)

The question addressed in Table 5.8.3.3 has to do with whether male or female schizophrenics are diagnosed at significantly different average ages. Most research suggests that male schizophrenics receive a positive diagnosis earlier than do females. This generalization coincides with an earlier review of the literature (Hafner & an der Heiden 1997).

Table 5.8.3.3. Age of onset of schizophrenia (diagnosis).

Nature of Any Difference	Citations
Males earlier	**AFRICA** *Nigeria*: Ohaeri 1992 **ASIA** *India*: R Walker 1961*; WW Eaton et al. 1995; *Japan*: Shimizu et al. 1988 **EUROPE** *Britain*: McCabe 1975; Castle et al. 1993; Faraone et al. 1994a; Jablensky & Cole 1997*; *Denmark*: Fremming 1951; McCabe 1975; Nystrup 1976; Loffler et al. 1994; Hafner et al. 1998; *Finland*: Gureje 1991; Rasanen et al. 1999a; *Germany*: E Bleuler 1911; Kraepein 1919; M Bleuler 1972; Huber et al. 1976; Hafner 1987; Angermeyer & Kuhn 1988; Hafner et al. 1989; Hafner et al. 1991; Franzek & Beckmann 1992; Hambrecht et al. 1992a*; Hambrecht et al. 1992b*; DJ Castle & Murray 1993; Hafner et al. 1993b*; Hafner et al. 1994; Hambrecht et al. 1994; Hafner et al. 1995; Hafner 1998a; Hafner et al. 1998b; Konnecke et al. 2000; *Great Britain*: Noreik & Odegard 1966; Hafner et al. 1993b*; *Iceland*: Helgason 1964; *Norway*: Noreik & Odegard 1967; *Spain*: Vazquez-Barquero et al. 1995 (males earlier onset); *Sweden*: Achte 1967*; Forrest & Hay 1972*; Nystrup 1976 **LATIN AMERICA** *Brazil*: Menezes & Mann 1993; *Caribbean Countries*: Wessely et al. 1991 **NORTH AMERICA** *Canada*: Seeman 1981; Seeman 1982; Flor-Henry 1985; *United States*: Rosanoff et al. 1934b; Malzberg 1935; White 1935; Landis & Page 1938; R Walker 1961*; Belmont et al. 1964; Achte 1967*; Mednick & Schulsinger 1968; Pollack et al. 1968; W Hartman & Mayer 1969; A Forrest & A Hay 1971; Slater & Cowie 1971; Forrest & Hay 1972*; Weiner & Marvit 1977* (White, Japanese, Chinese); Weisman & Klerman 1977; Kramer 1978; Lewine 1980; Lewine et al. 1981; Loranger 1984; WW Eaton 1985; Wattie & Kedward 1985; M Kramer 1988; Goldstein et al. 1989; Hafner et al. 1989; Flor-Henry 1990; Hambrecht et al. 1992a*; Hambrecht et al. 1992b*; Castle et al. 1993; Beratis et al. 1994; Szymanski et al. 1995; Kirov et al. 1996; Meltzer et al. 1997; Castle et al. 1998; Lewine 2004 **OCEANIA** *Australia*: Gureje & Bamidele 1998 **INTERNATIONAL** *Multiple Countries*: Sartorius et al. 1986; Jablensky et al. 1992; Jablensky & Cole 1997
No signif. difference	**ASIA** *Japan*: Shimizu et al. 1988; Shimizu & Kurachi 1989 **EUROPE** *Britain*: Kendler & Walsh 1995; *Croatia*: Folnegovic-Smalz et al. 1990; Folnegovic & Folnegovic-Smalz 1994; *Sweden*: Suvisaari et al. 1998 **NORTH AMERICA** *Canada*: Addington et al. 1996 (small samples); *United States*: Locke et al. 1958; Leboyer et al. 1992; DeLisi et al. 1994a; Albus & Maier 1995; Gorwood et al. 1995
Females earlier	**ASIA** *India*: Gangadhar et al. 2002:318 **NORTH AMERICA** *United States*: Weiner & Marvit 1977* (Filipino)

5.8.3.4. Relationship Between Schizophrenia and Season of Birth

Several studies have found that schizophrenics are more likely than non-schizophrenics to have been born in the winter (reviewed by Bradbury & Miller 1985; Pulver et al. 1992). The three studies that have sought to determine if this tendency might be more true for one sex than for the other have reached inconsistent conclusions (Table 5.8.3.4).

Table 5.8.3.4. Relationship between schizophrenia and season of birth.

Nature of Any Difference	Postpubertal	Multiple Age Category
	Adult	
Males more	**EUROPE** *Italy*: Balestrieri et al. 1997 (adult)	**EUROPE** *Britain*: Eagles et al. 1995
No signif. difference		
Females more	**EUROPE** *France*: Dassa et al. 1996	

5.8.3.5. Pre-morbid Social Competence of Schizophrenics

Before being diagnosed with schizophrenia, many sufferers exhibit poor social competency skills. The available studies on which sex is most prone toward this pre-morbid schizophrenic symptomology have all concluded that it is more common in females than in males (Table 5.8.3.5).

Table 5.8.3.5. Premorbid social competence of schizophrenics.

Nature of Any Difference	Postpubertal
	Adult
Males more	
No signif. difference	
Females more	**NORTH AMERICA** *United States*: Farina et al. 1962; Lane 1968; Allon 1971; Rosen et al. 1971; Klorman et al. 1977; Kokes et al. 1977; Zigler et al. 1977

5.8.3.6. Competence/Independence After Being Diagnosed With Schizophrenia

A few studies have compared the sexes regarding their abilities to live competent and self-sufficient lives after having been diagnosed with schizophrenia. As in the case of social competence prior to diagnosis, female schizophrenics appear to be better able to live independently on average than are their male counterparts (Table 5.8.3.6).

Table 5.8.3.6. Competence/independence after being diagnosed with schizophrenia.

Nature of Any Difference	Postpubertal
	Adult
Males more	
No signif. difference	
Females more	**EUROPE** *Germany*: Hafner 2003 (respond better to treatment); *Spain*: Vazquez-Barquero et al. 1999 (independent); Usall et al. 2002 (independent) **NORTH AMERICA** *United States*: McGlashan & Bardenstein 1990 (independent); Test et al. 1990 (independent); Andia et al. 1995 (independent)

5.8.3.7. Neurological Impairment Associated With Schizophrenia

One study concluded that males with schizophrenia exhibited more neurological symptomatology than did females with schizophrenia (Table 5.8.3.7).

Table 5.8.3.7. Neurological impairment associated with schizophrenia.

Nature of Any Difference	Postpubertal
	Adult
Males more	**NORTH AMERICA** *United States*: Cowell et al. 1996
No signif. difference	
Females more	

5.8.4. Suicide

Suicide is the taking of one's own life. While it is not appropriate to consider suicide a mental illness, suicidal thoughts and attempts are frequently associated with various mental illnesses, particularly depression. Therefore, for lack of a more appropriate category under which to subsume thoughts and acts associated with suicide (not all of which result in death), these phenomena are being given attention here with respect to gender differences.

5.8.4.1. Suicide Ideation

Suicide ideation refers to individuals giving serious consideration to killing oneself. Many studies have sought to determine which sex is most likely to engage in suicide ideation. Table 5.8.4.1 indicates that research findings have been somewhat mixed. Among adolescents, most of the studies indicate that females are more likely to entertain these thoughts than males. Among adults (as well as multiple age groupings), however, the evidence is less clear with respect to sex differences in suicide ideation.

Table 5.8.4.1. Suicide ideation.

Nature of Any Difference	Postpubertal		Multiple Age Categories
	Adolescent	Adult	
Males more		**NORTH AMERICA** *United States*: Grossman et al. 2001 (compared to gay and lesbian women)	**EUROPE** *Denmark*: Kjoller & Helweg-Larsen 2000 **NORTH AMERICA** *United States*: Burr et al. 1999:1056 (Blacks)
No signif. difference	**ASIA** *Hong Kong*: Lai & McBride-Chang 2001 **EUROPE** *Norway*: Wichstrom & Rossow 2002 **NORTH AMERICA** *United States*: Grunbaum et al. 1998:155	**NORTH AMERICA** *United States*: Cameron 1972 (young); Craig & Senter 1972 (young); Leonard & Flinn 1972 (young); DC Murray 1973:178 (young); WM Reynolds 1991 **OCEANIA** *Australia*: Schweitzer et al. 1995	**NORTH AMERICA** *United States*: Rudd 1990
Females more	**ASIA** *China*: Hu 1994; Hesketch et al. 2002; *Hong Kong*: SM Stewart et al. 1999a; *Singapore*: J Ball & Moselle 1999 **NORTH AMERICA** *Canada*: Cote et al. 1989; Pronovost et al. 1990; De Man et al. 1993; *United States*: Rosenstock 1985; CZ Garrison et al. 1991; Andrews & Lewinsohn 1992; AR Rich et al. 1992; JW Swanson et al. 1992; Lewinsohn et al. 1994b; Lewinsohn et al. 1996; Zhang & Jin 1996* (college); Canetto 1997; LS Bensley 1999a; Marcenko et al. 1999 **OCEANIA** *Australia*: G Martin et al. 2004:496; *Guam*: Pinhey & Millman 2004:1207; *New Zealand*: DM Fergusson & Lynskey 1995; Allison et al. 2001; TF Locke & Newcomb 2003:55	**ASIA** *China*: Zhang & Jin 1996* (college) **EUROPE** *Germany*: Barnow & Linden 1997 (elderly) **NORTH AMERICA** *United States*: Shneidman 1971:78 (young); Nisbet 1996 (Blacks); GB West et al. 1996:318 (college); Zhang & Jin 1996* (college)	**EUROPE** *Sweden*: Renberg 2001 **NORTH AMERICA** *Canada*: Charron 1981; *United States*: Paykel et al. 1974 **INTERNATIONAL** *Multiple Countries*: Weissman et al. 1999a

5.8.4.2. Attempted Suicide

The number of studies of sex differences in attempted suicide (usually without success) is substantial. As shown in Split-Tables 5.8.4.2a, there is only a slight tendency for females to attempt suicide more than males during adolescence.

Split-Table 5.8.4.2a. Attempted suicide (adolescents).

Nature of Any Difference	Postpubertal
	Adolescent
Males more	**NORTH AMERICA** *United States*: B Bettes & Walker 1986 (anxiety related); Vannatta 1996 (among teens living in unstable homes); Vannatta 1997 (among teens living in unstable homes); BA Johnson et al. 1998:20
No signif. difference	**NORTH AMERICA** *United States*: Ohring et al. 1996 (anxiety related); D Shaffer et al. 1996* (Blacks); Grunbaum et al. 1998:155 (Whites) **OCEANIA** *Australia*: G Martin et al. 2004 (childhood sexual abuse victims)
Females more	**EUROPE** *Britain*: Hawton & Goldacre 1982; *Norway*: Rossow & Wichstrom 1994; *Finland*: Kotila & Lonnqvist 1989 **MIDDLE EAST** *Israel*: Apter et al. 1995; Farbstein et al. 2002 (hospital records) **NORTH AMERICA** *United States*: RB Cairns et al. 1988a; Andrews & Lewinsohn 1992; Ingersoll et al. 1993:73; D Shaffer et al. 1996* (Whites); MD Resnick et al. 1997; R Garofalo et al. 1999; MacKay et al. 2000; NH Falkner et al. 2001:37-38; Slap et al. 2001 **OCEANIA** *Guam*: Pinhey & Millman 2004:1207

However, among adults as well as among multiple or unspecified age groups, most studies have concluded that females attempt suicide in greater proportions than do males (Split-Table 5.8.4.2b).

Split-Table 5.8.4.2b. Attempted suicide (postpubertals except adolescent).

Nature of Any Difference	Postpubertal	Multiple Age Categories
	Adult	
Males more		**EUROPE** *Finland*: Schmidtke et al. 1996*; Hintikka et al. 1998b; Ostamo et al. 2002:453 (in 1989)*; *Latvia*: Rancans et al. 2003; *Sweden*: Soukas et al. 2001 **NORTH AMERICA** *Canada*: Holley et al. 1998 (hospitalized); *United States*: Molnar et al. 2001 (childhood sexual abuse victims)
No signif. difference	**NORTH AMERICA** *United States*: GB West et al. 1996:318 (college)	**ASIA** *India*: Venkoba 1965; Venkoba 1971 **EUROPE** *Finland*: Ostamo et al. 2002:453* (in 1997); *Poland*: Weissman 1974
Females more	**EUROPE** *Britain*: HE Ross et al. 1988 (alcoholics & drug addicts) **NORTH AMERICA** *Canada*: SS Martins et al. 2004:1233 (pathological gamblers)	**ASIA** *India*: Tousignant et al. 1998 **EUROPE** *Britain*: Stengel 1952; Parkin & Stengel 1965; GG Ellis et al. 1966; PK Bridges & Koller 1966; Hershon 1968; J Roberts & Hooper 1969; JS Smith & Davison 1971; Jacobson & Tribe 1972; Townsend et al. 2001 (using drugs); *Denmark*: Hansen & Wang 1984; Kjoller & Helweg-Larsen 2000; *Scotland*: Sclare & Hamilton 1963; Aitken et al. 1969; Patel et al. 1972; Hawton et al. 1995; *Sweden*: Renberg 2001; Skogman et al. 2004; *Multiple Countries*: Schmidtke et al. 1994; Schmidtke et al. 1996* (except Finland) **MIDDLE EAST** *Israel*: Modan et al. 1970; Gershon & Liebowitz 1975; *Pakistan*: Khan & Reza 1998 **NORTH AMERICA** *United States*: Farberow & Shneidman 1961; J Hirsh et al. 1961; Stengel 1964; Clendenin & Murphy 1971; SI Miller & Schoenfeld 1971; MM Weissman 1974; Dahlgren 1977; M Wilson 1981; Hendin 1982; Kessler & McRae 1983; Kushner 1985; Dube et al. 2001 **OCEANIA** *Australia*: IP James et al. 1963; Krupinski et al. 1966; JE Edwards & Whitlock 1968; Hetzel 1971; Oliver 1971; *Tasmania*: N Gold 1966; JW Freeman et al. 1970 **INTERNATIONAL** *Multiple Countries*: A Pokorny 1965; Weissman et al. 1999a

5.8.4.3. Completed Suicide

A massive number of studies have investigated gender differences in the commission of suicide. As shown in Split-Table 5.8.4.3a, the vast majority of these studies have concluded that males commit suicide at higher rates than do females.

Split-Table 5.8.4.3a. Completed suicide (postpubertal).

Nature of Any Difference	Postpubertal	
	Adolescent	Adult
Males more	**AFRICA** *South Africa*: Flisher & Parry 1994* **EUROPE** *Finland*: Marttunen et al. 1995 (4.7 to 1); *Norway*: Groholt et al. 1997; Groholt et al. 1999 (3 to 1); Mehlum et al. 1999* **NORTH AMERICA** *United States*: Holinger 1978; P Fisher & Shaffer 1984; Motto 1984; Sudak et al. 1984; AL Berman 1986; KS Smith 1990; Brent et al. 1993 (5.7 to 1); CR Bingham et al. 1994; Holinger et al. 1994; National Center for Health Statistics 1994*; MS Gould et al. 1996 (4 to 1) **OCEANIA** *Australia*: Dudley et al. 1997; Dudley et al. 1998; CH Cantor et al. 1999:138*; Lynskey et al. 2000; *Micronesia*: Rubinstein 1992; *Western Pacific Islands*: H Booth 1999a **INTERNATIONAL** *Multiple Countries*: D Trovato & Lalu 1998:138*	**AFRICA** *South Africa*: Flisher & Parry 1994* **EUROPE** *Britain*: Hawton 1992 (young); Gunnell et al. 2002 (depressed persons); *Finland*: Koivumaa-Honkanen et al. 2001 (persons dissatisfied with life); *Norway*: Mehlum et al. 1999* (young) **NORTH AMERICA** *United States*: Resnik & Canter 1970 (elderly); Hirsch 1981:290; CJ Frederick 1984; Steffensmeier 1984; Rich et al. 1988; JL McIntosh 1989 (elderly); Canetto 1992 (elderly); Yang & Lester 1992 (married persons); Carney et al. 1994 (elderly); National Center for Health Statistics 1994*; MA Young et al. 1994; Canetto & Lester 1995; CH Cantor et al. 1999:138*; Vollum & Titterington 2001; Canetto & Lester 2002 **OCEANIA** *Australia*: J Snowdon 1997 (elderly)
No signif. difference		
Females more		**ASIA** *China*: Pritchard 1996; Ji et al. 2001 **EUROPE** *Norway*: I Rossow 1994 (drug addicts) **OCEANA** *Australia*: Battersby et al. 1996 (among depressed patients taking antidepressants)

Most studies of completed suicides do not separate adults and adolescents, thereby explaining why most studies of suicides have been put into the multiple age category. Split-Table 5.8.4.3b shows that the vast majority of studies have concluded that males are more prone toward such lethal acts than females. It is interesting to note that a high proportion of the exceptional findings – in the sense of females committing suicide at a higher or equivalent rate as males – have come from studies conducted in China.

Split-Table 5.8.4.3b. Completed suicide (multiple ages).

Nature of Any Difference							Multiple Age Categories
Males more							**AFRICA** *South Africa*: GL Klerman 1987; D Lester 1989; Lerer 1992:95; Flisher & Parry 1994:350 **ASIA** *China*: Hau 1993; Yip 1997; Yip 1998a*; *Hong Kong*: Yip 1958; Yip 1996*; *Russia*: Leon et al. 1997; *Soviet Union*: Wasserman & Varnik 1998; *Taiwan*: Yip 1996* **EUROPE** *Austria*: Etzersdorfer et al. 1996; *Britain*: Barraclough et al. 1974; Merrill & Owens 1986 (poisoning); EM Murphy et al. 1986; McClure 1987; C Pritchard 1988; Charlton et al. 1992; Charlton et al. 1993; Charlton 1995; S Kelly et al. 1995; Saunderson & Langford 1996; Hawton et al. 1997; S Kelly & Bunting 1998; Gunnell et al. 1999; McClelland et al. 2000; McClure 2000; N Middleton et al. 2003; *Finland*: Isometsa et al. 1994 (depressed people); Koskinen & Martelin 1994:1392; Ohberg et al. 1995; *Germany*: Chipuer & von Eye 1989*; Linn & Lester 1997; *Italy*: LaVecchia et al. 1986a; D'Avanzo et al. 1993; Preti 1998:11; *Lithuania*: Kalediene 1999; *Netherlands*: van Houwelingen & Beersma 2001; *Northern Ireland*: T Foster et al. 1997; *Norway*: Statistics Norway 1994 (2.8 to 1); Rutz 1996; *Portugal*: Ferreria de Castro et al. 1988; *Spain*: Granizo et al. 1996 *Sweden*: Allebeck et al. 1996; Rutz et al. 1997; *Several European Countries*: Durkheim 1897:176 (English publication 1951); *Several Scandinavian Countries*: Retterstol 1992; **MIDDLE EAST** *Israel*: Modan et al. 1970; Levav & Aisenberg 1989 **NORTH AMERICA** *Canada*: Luce & Wand 1977:89 (2.5 times more); MI Solomon & Hellon 1980; Chipuer & von Eye 1989*; Maxim & Keane 1992; Trovato & Vos 1992; Krull & Trovato 1994; Leenaars & Lester 1996; *United States*: Marsaryk 1881; Morselli 1882:196; Farberow & Shneidman 1961; Weschler 1961; Dublin 1963; Stengel 1964; J Massey 1967; Lester 1969; Garai 1970; Diggory 1976; Linden & Breed 1976:83; A Johnson 1977a:30; Weissman & Klerman 1977b:740; Hopper & Guttmacher 1979; Lester 1979; GE Murphy & Wetzel 1980; Boor 1981; M Wilson 1981; McIntosh & Santos 1982; Neuringer 1982; Waldron 1982:73; Ahlburg & Schapiro 1984; Steffensmeier 1984 (Whites); M Frazer 1985; S Stack & Danigelis 1985; McIntosh 1986; CL Rich et al. 1986; Waldron 1986:41; Leenaars 1987; Hoberman & Garfinkel 1988 (4.3 to 1); M Stafford & Weisheit 1988; Leenaars 1989; Lester 1994a; Rockett & Smith 1989; RL Austin et al. 1992; C Holden 1992:1761; Moscicki 1994; Kochanek & Hudson 1995; Shiang et al. 1997; GE Murphy 1998:166; Pampel 1998; LH Chaudron & Remington 1999 (from 1980-1994); Kramarow et al. 1999; US Dept. of Health and Human Services 2001; Batton 2004:440 **OCEANIA** *Australia*: JE Edwards & Whitlock 1968; G Oliver & Hetzel 1973; Whitlock 1975; Dorsch & Roder 1983; CL Rich et al. 1988; Hassan & Carr 1989; Hassan & Tan 1989; Pritchard 1992; Pritchard 1996*; Ho et al. 1998: 468; Yip 1998a*; Blair-West et al. 1999; D Wilkinson & Gunnell 2000; Yip et al. 2000*; AN Page & Fragar 2002 (rural); J Snowdon & Hunt 2002:267; *New Zealand*: Skegg & Cox 1991 **INTERNATIONAL** *Multiple Countries*: Gibbs & Martin 1964:183; Gibbs 1971; Linehan 1971; Sainsbury 1972; Vigderhous & Fishman 1977; S Platt 1984; Sainsbury 1986; Barraclough 1988; Lester 1990; C Pritchard 1990; Lester 1991b; Diekstra 1992; C Girard 1993 (worldwide); D Lester 1993:348; LaVecchia 1994 (worldwide); CH Cantor et al. 1996 (Western countries); Fernquist et al. 1998; Pampel 1998:751 (18 countries); Fernquist 1999; Schmidtke et al. 1999; LaVecchia et al. 2000:82-108* (worldwide); P Cutright & Fernquist 2001:86; Heuveline & Slap 2002:32; C Pritchard & Baldwin 2002* (several English-speaking countries); F Levi et al. 2003b (worldwide); FW Rudmin et al. 2003
No signif. difference							**AFRICA** *Egypt*: Okasha & Lotaif 1979 **ASIA** *China*: Yip 1996*; Yip et al. 2000* **EUROPE** *Finland*: Patja et al. 2001:308 (persons with mental retardation) **INTERNATIONAL** *Multiple Countries*: Trovato & Lalu 1998:17* (7 countries)
Females more							**AFRICA** *Ethiopia*: Alem et al. 1999b **ASIA** *China*: V Pearson 1995; He 1996; C Pritchard 1996*; J Zhang 1996; He & Lester 1997; He & Lester 1998; MR Phillips et al. 1999; E Rosenthal 1999; He & Lester 2002; Phillips et al. 2002; C Pritchard & Baldwin 2002* (elderly) **EUROPE** *Ireland*: Kelleher et al. 1999: 176

One must be struck by the contrast between this table and Tables 5.8.4.1 and 5.8.4.2, both of which indicate that females are usually more likely to contemplate and attempt suicide than males. The most common explanation is that males generally use more lethal means of killing themselves (e.g., firearms, hanging) than is the case for females (who are more likely to take an overdose of drugs), a point documented in a subsequent table.

5.8.4.4. Attempted/Completed Suicide Among Manic Depressives

Persons who are diagnosed with manic depression (bipolar depression) are at elevated risk of suicide. Consequently, several studies have investigated gender differences in suicidal acts by manic depressives, the results of which are summarized in Table 5.8.4.4. This table presents a less clear picture of gender differences for completed suicide than is the case for suicide among most general populations. However, in the case of attempted suicides, female manic depressives predominate over their male counterparts, just as they do in nearly all studies of the population at large.

Table 5.8.4.4. Attempted/completed suicide among manic depressives.

Nature of Any Difference					Postpubertal	
						Adult
Males more						**EUROPE** *Britain*: Woodruff et al. 1971 (attempted); *Sweden*: Stenstedt 1952 (completed); Weeke 1975 (completed) **NORTH AMERICA** *United States*: Egeland & Sussex 1985 (completed)
No signif. difference						**EUROPE** *Finland*: Kraeplin 1921 (attempted); *Germany*: Mitterauer et al. 1988 (attempted)
Females more						**EUROPE** *Britain*: Roy-Byrne et al. 1988 (attempted); *Poland*: Linkowski et al. 1985 (attempted); *Sweden*: Dahlgren 1944 (completed); Ringel 1953 (completed); Astrup et al. 1959 (attempted); Ettlinger 1964 (completed); Perris & d'Elia 1966 (attempted) **NORTH AMERICA** *United States*: Winokur et al. 1969 (attempted); Johnson & Hunt 1979 (attempted); Stallone et al. 1980 (attempted); Goldring & Fieve 1984 (attempted)

5.8.4.5. Methods of Suicide (Attempted/Completed)

Table 5.8.4.5 addresses the question of how males and females differ in terms of the methods they use in committing or attempting suicide. While the number of studies is minimal, they suggest that males tend to use more lethal methods than is true for females. This is likely to help explain why even though females appear to attempt suicide more often, males more often succeed in doing so.

Table 5.8.4.5. Methods of suicide (attempted/completed).

Nature of Any Difference			Multiple Age Categories
Males use more			**AFRICA** *Ethiopia*: Alem et al. 1999b (guns, hanging) **ASIA** *Hong Kong*: Ho et al. 1998:469* (poisoning) **EUROPE** *Hungary*: Osvath et al. 2003* (hanging/cutting) **NORTH AMERICA** *United States*: McIntosh & Santos 1986* (lethal methods such as firearms)
No signif. difference			**EUROPE** *Britain*: Shah et al. 2001:1207 (depressed persons taking antidepressant drugs)
Females use more			**ASIA** *Hong Kong*: Ho et al. 1998:469* (drowning) **EUROPE** *Hungary*: Osvath et al. 2003* (drug overdose) **NORTH AMERICA** *United States*: McIntosh & Santos 1986* (drug overdose)

5.8.4.6. Relational Problems as Reasons for Suicide

Many suicides are precipitated by problems with social or romantic relationships. Table 5.8.4.6 indicates that this is usually as true for males as it is for females.

Table 5.8.4.6. Relational problems as reasons for suicide.

Nature of Any Difference	Postpubertal	
		Adult
Males more		
No signif. difference		**ASIA** *Hong Kong*: Ho et al. 1998 **EUROPE** *Britain*: McClelland et al. 2000; *Germany*: Linn & Lester 1997 **NORTH AMERICA** *United States*: Canetto & Lester 2002
Females more		**NORTH AMERICA** *United States*: Leenaars 1989

5.8.4.7. Being Deterred From Committing Suicide

Two studies concluded that among persons contemplating suicide, females were more easily deterred than were males (Table 5.8.4.7).

Table 5.8.4.7. Being deterred from committing suicide.

Nature of Any Difference	Postpubertal		Multiple Age Categories
	Adolescent		
Males more easily			
No signif. difference			
Females more easily	**NORTH AMERICA** *United States*: Overholser et al. 1990 (high school counseling)		**NORTH AMERICA** *Canada*: Leemaars & Lester 1996 (restrictive firearm legislation)

5.9
MENTAL/PERSONALITY/BEHAVIORAL/ EMOTIONAL DISORDERS

Mental, personality, and behavioral disorders tend to be less serious than the mental illnesses (already covered). While there is no sharp dividing line between disorders and illnesses, mere disorders are less likely to result in any institutional or even physician-lead treatment than in the case of illnesses.

5.9.1. Psychological/Mental Problems

Psychological/mental problems in the present context refer to relatively less serious forms of mental illnesses.

5.9.1.1. Psychological Distress/Mental Problems in General

Nearly all of the research pertaining to which sex has greater feelings of mental or psychological problems was based on self-reports. As shown in Table 5.9.1.1, most of the pertinent studies suggest that females exhibit these tendencies to a greater extent than do males. This table does not mean that most females have mental problems or that most males do not; it simply reflects differences in averages and proportions, depending on how questions were asked of subjects providing input to each study.

Table 5.9.1.1. Psychological distress/mental problems in general.

Nature of Any Difference	Prepubertal				Postpubertal	
				Childhood	Adolescent	Adult
Males more						
No signif. difference						
Females more				**NORTH AMERICA** *United States*: Crick 1997	**NORTH AMERICA** *United States*: Burrow et al. 2004:278 (adoptees)	**AFRICA** *Ethiopia*: Tafari et al. 1991 (sub-clinical mental illness); Alem et al. 1999a (sub-clinical mental illness); Kebede et al. 1999 (sub-clinical mental illness); *Zimbabwe*: Patel et al. 1997 (sub-clinical mental illness) **NORTH AMERICA** *United States*: Colten 1979 (heroine addicts); Kosten et al. 1985 (opiate addicts); Blume 1986 (alcoholics); Marsh & Simpson 1986 (opiate addicts); Paykel 1991; Kessler et al. 1994a (sub-clinical mental illness); Lennon 1995 (sub-clinical mental illness); AC King et al. 2003 (among alcoholics)

5.9.1.2. Sense of Coherence/Mental Stability in General

Feelings of mental stability or well-being may be reasonably thought of as the opposite of experiencing psychological distress (see the preceding table). Predictably, therefore, most studies have found males to rate themselves as more mentally stable as the like to a greater degree than females.

Table 5.9.1.2. Sense of coherence/mental stability in general.

Nature of Any Difference					Postpubertal		Multiple Age Categories
						Adult	
Males more						**ASIA** *Thailand*: TD Fuller et al. 2004 (married couples) **EUROPE** *Finland*: Suominen et al. 1999; *Sweden*: Antonovsky & Sagy 1985 **MIDDLE EAST** *Israel*: Carmel et al. 1991 (Kibbutz residents)	**EUROPE** *Finland*: Anson et al. 1993
No signif. difference						**EUROPE** *Finland*: Volanen et al. 2004	
Females more							

5.9.1.3. Neuroticism

Neuroticism refers to being in a prolonged state of anxiety, having at least mild depression, and being vulnerable to stress (Skodol & Bender 2003:357). It is often measured using questionnaire items contained within the Eysenck Personality Inventory. The results regarding the relationship between gender and neuroticism are summarized in Table 5.9.1.3. One can see that neuroticism appears to be more prevalent among females than males, although several studies have failed to reveal a significant difference.

Table 5.9.1.3. Neuroticism.

Nature of Any Difference	Prepubertal				Postpubertal		Multiple Age Categories
				Childhood	Adolescent	Adult	
Males higher						**AFRICA** *Nigeria*: AH Leighton et al. 1963 (Yoruba tribe)	
No signif. difference					**NORTH AMERICA** *United States*: Terman et al. 1925 (young)	**EUROPE** *Britain*: M Willmott & Brierley 1984 (Eysenck scale); DA Clark et al. 1987:7 (young) **NORTH AMERICA** *Canada*: JD Parker et al. 1989:601 (young)	**NORTH AMERICA** *United States*: F Brown 1934 (ages 9-14)
Females higher				**EUROPE** *Britain*: SB Eysenck et al. 1994:203	**EUROPE** *Britain*: Costello & Brachman 1962* (high school); LJ Francis et al. 1995:622 **NORTH AMERICA** *Canada*: Costello & Brachman 1962* (high school); *United States*: Bernreuter 1933; HD Carter 1935 (twins); HM Bell 1939; PA Brown 1939 (blind & sighted); Trumbull 1953	**EUROPE** *Britain*: Sanderman et al. 1991*; SB Eysenck et al. 1993* (young); Faith et al. 2001; *Netherlands*: Sanderman et al. 1991* **NORTH AMERICA** *Canada*: SB Eysenck et al. 1993* (young); *United States*: Stagner 1932; M Shepherd & Gruenberg 1957; Kessel & Shepherd 1962; Jardine et al. 1984; Corbitt & Widiger 1995; Fanous et al. 2002 (twins, diagnosed) **INTERNATIONAL** *Multiple Countries*: Lynn & Martin 1997 (37 out of 37 countries)	

5.9.1.4. Heritability of Neuroticism

Two studies examined sex differences in the heritability of neuroticism using twin study methodology. One study concluded that females exhibited greater heritability than males while the other study found no significant difference (Table 5.9.1.4).

Table 5.9.1.4. Heritability of neuroticism.

Nature of Any Difference						Postpubertal
						Adult
Greater among males						
No signif. difference						**NORTH AMERICA** *United States*: Fanous et al. 2002 (twins)
Greater among females						**EUROPE** *Britain*: Macaskill et al. 1992 (twins)

5.9.2. Personality Disorders

Findings pertaining to psychological conditions known as personality disorders are reviewed below with respect to possible sex differences.

5.9.2.1. Personality Disorders in General

All of the studies of personality disorders in general have concluded that males are more often affected than are females (Table 5.9.2.1).

Table 5.9.2.1. Personality disorders in general.

Nature of Any Difference						Postpubertal
						Adult
Males more						**EUROPE** *Norway*: Torgensen et al. 2001 (community sample) **NORTH AMERICA** *United States*: HJ Jackson et al. 1991; Grilo et al. 1996 (young); JD Carter et al. 1999 (depressed patients); Grilo et al. 2002 (Hispanics)
No signif. difference						
Females more						

5.9.2.2. Borderline Personality Disorder

Borderline personality disorder (BPD) refers to substantial tendencies toward disorganized and unstable self-image, self-esteem, and interpersonal relationships. The diagnosis of BPD is usually performed by a trained psychologist or psychiatrist. Affected individuals are prone toward bouts of excessive spending, promiscuity, gambling, and drug abuse, especially during times of stress.

Table 5.9.2.2 shows that most studies have found BPD to be more common among females than among males. The exceptions are studies based on self-reported BPD symptoms by college students, in which no gender differences have been found, and one study of clinically depressed patients, among whom males were found to exhibit BPD to a greater extent than females.

Table 5.9.2.2. Borderline personality disorder.

Nature of Any Difference					Postpubertal	
						Adult
Males more						**NORTH AMERICA** *United States*: JD Carter et al. 1999 (among depressed patients)
No signif. difference						**EUROPE** *Norway*: Torgensen et al. 2001 **NORTH AMERICA** *United States*: Golomb et al. 1995; JD Carter et al. 1999; Torgensen et al. 2001; Klonsky et al. 2002 (college, based on self-ratings); Morey et al. 2002 (college, based on self-ratings); DM Johnson et al. 2003
Females more						**NORTH AMERICA** *United States*: Gunderson & Zanarini 1987 (diagnosed); Sprock et al. 1990; Swartz et al. 1990 (diagnosed); HJ Jackson et al. 1991; Widiger & Weissman 1991 (diagnosed); Golomb et al. 1995; Grilo et al. 1996 (young); Zanarini et al. 1997 (diagnosed); Zanarini et al. 1999; Grilo 2002

5.9.2.3. Narcissistic Personality Disorder

The narcissistic personality disorder is typified by the tendency to be unusually self-centered. As shown in Table 5.9.2.3, this type of personality disorder appears to be more common among males.

Table 5.9.2.3. Narcissistic personality disorder.

Nature of Any Difference					Postpubertal	
						Adult
Males more						**EUROPE** *Norway*: Torgensen et al. 2001 (community sample) **NORTH AMERICA** *United States*: Golomb et al. 1995; JD Carter et al. 1999 (depressed patients)
No signif. difference						
Females more						

5.9.3. Addictive Disorders

People who seem to be internally driven toward some activities, such as the consumption of various drugs or foods or toward gambling, are said to be addicted toward that activity. The following tables report the findings from research on sex differences in addiction proneness.

5.9.3.1. Addiction Proneness in General

In one study, both sexes were asked to rate the extent to which they were becoming, or could become, addicted to a wide variety of substances. As shown in Table 5.9.3.1, the study suggested that males thought they were more prone to addiction to alcohol and illegal drugs, while females considered themselves more addiction prone with regard to food and cigarettes.

Table 5.9.3.1. Addiction proneness in general.

Nature of Any Difference					Postpubertal	
						Adult
Males higher						**NORTH AMERICA** *United States*: Eisenman et al. 2004* (college, self-rated, alcohol & illegal drugs)
No significant difference						
Females higher						**NORTH AMERICA** *United States*: Cleary et al. 2004:43* (food problems); Eisenman et al. 2004* (college, self-rated, food and cigarettes)

5.9.3.2. Drug Addiction/Substance Abuse Disorders

Persons who use various drugs – particularly drugs such as cocaine, heroin, marijuana, and even alcohol and nicotine – in ways that appear to be regular and compulsive are said to be substance abusers or drug addicts. Table 5.9.3.2 shows that the research findings have been very inconsistent with respect to any clear gender difference in substance abuse and drug addiction.

Table 5.9.3.2. Drug addiction/substance abuse disorders.

Nature of Any Difference					Postpubertal		Multiple Age Categories
					Adolescents	Adult	
Males more					**NORTH AMERICA** *Canada*: Boyle & Offord 1986; *United States*: Bukstein et al. 1992	**NORTH AMERICA** *United States*: Cleary et al. 2004:43 **INTERNATIONAL** *Multiple Scandinavian Countries*: Bjornson et al. 1995 (nicotine addiction)	**EUROPE** *Netherlands*: de Graaf et al. 2002:623; **NORTH AMERICA** *United States*: RG Newman et al. 1974:58; McCaughrin & Howard 1996 (treated for drug abuse); Ploeger-Dizon et al. 1997; Substance Abuse & Mental Health Services Administration 1997; Robles et al. 1998
No signif. difference							
Females more						**EUROPE** *Britain*: Glatt 1962 (hospitalized alcoholics, barbituate addicts); Sclare 1970 (hospitalized alcoholics) **NORTH AMERICA** *United States*: Texon 1950 (hospitalized alcoholics); McCullough 1952 (hospitalized alcoholics); Curlee 1970 (hospitalized alcoholics); Rathod & Thompson 1971 (hospitalized alcoholics); Rubin et al. 1996 (abuse relapse following stress); SJ Boyd et al. 2004:287 (strongly addicted to heroin); McChargue et al. 2004 (college, among smokers)	

5.9.3.3. Genetic Predisposition to Drug Addiction

According to twin and adoption studies, genes have an influence on the likelihood of people becoming addicted to recreational drugs such as cocaine, heroin, and even marijuana (e.g., Cadoret et al. 1986; Grove et al. 1990; Tsuang et al. 1996). Two studies sought to determine if a gender difference might exist in this regard. One found that genetic susceptibility to drug addiction was essentially the same for males and females, while the other found it to be greater in males (Table 5.9.3.3).

Table 5.9.3.3. Genetic predisposition to drug addiction.

Nature of Any Difference						Postpubertal
						Adult
Greater in males						**ASIA** *Korea*: HS Lee et al. 2002
No signif. difference						**NORTH AMERICA** *United States*: Cadoret et al. 1986
Greater in females						

5.9.3.4. Problem Drinking/Alcohol Dependency

Numerous studies have sought to determine if problem drinking or alcohol dependency (short of alcoholism) is more common in one sex than the other. Table 5.9.3.4 shows that all of these studies have agreed that such conditions are more characteristic of males than of females.

Table 5.9.3.4. Problem drinking/alcohol dependency.

Nature of Any Dif-ference					Postpubertal		Multiple Age Categories
					Adolescent	Adult	
Males more					**NORTH AMERICA** *United States*: Forslund 1979; Pope et al. 1994:359 (reported behavior and peer risk factors)	**EUROPE** *Germany*: Bischof et al. 2000 (elderly, self-report) **NORTH AMERICA** *United States*: Mulford 1977 (young); WB Clark & Midanik 1982; HJ Harwood et al. 1985; Engs & Hanson 1986 (young); BF Grant et al. 1991; ME Hilton 1991b; L Fisher et al. 1993; BF Grant et al. 1994; PD Friedmann et al. 1999:534 (elderly); CJ Wong et al. 2002 (among cocaine addicts) **RODENT** *Rat*: LL Devaud & Chadda 2001 (determined by bicuculline induced seizure threshold after ethanol withdrawal, slower recovery)	**NORTH AMERICA** *United States*: JK Jackson & Connor 1953
No signif. difference							
Females more							

5.9.3.5. Alcoholism

A large number of studies have reported statistics concerning gender differences in tendencies toward alcoholism. Table 5.9.3.5 shows that these studies have all but unanimously concluded that males exhibit higher rates of alcoholism than do females. (Note that general alcohol consumption is discussed in Chapter 9.)

Table 5.9.3.5. Alcoholism.

Nature of Any Difference					Postpubertal		Multiple Age Categories
					Adolescent	Adult	
Males more					**NORTH AMERICA** *United States*: Newcomb & McGee 1989	**EUROPE** *Britain*: Pemberton 1967 (obtaining treatment); Winokur & Clayton 1967; Winokur & Clayton 1968; G Edwards et al. 1972; AF Davidson 1976 (receiving treatment); Glover & McCue 1977 (obtaining treatment); RG Smart 1979; K Walker et al. 1982 (receiving treatment); P Wallace et al. 1988; Sanchez-Craig et al. 1989 (receiving treatment); Sanchez-Craig et al. 1991 (receiving treatment); *Sweden*: Glatt 1955 (receiving treatment); Hemmingsson 1999:18 **NORTH AMERICA** *United States*: Hoff & McKeown 1953 (receiving treatment); DL Davies et al. 1956 (receiving treatment); ML Selzer & Holloway 1957 (obtaining treatment); Oltman & Friedman 1965; Cahalan et al. 1969; BJ Fitzgerald et al. 1971 (obtaining treatment); Reich et al. 1975:262; Gomberg 1974; JL Norris 1974; Rutledge et al. 1974; H Hoffman & Noem 1975; Popham & Schmidt 1976 (obtaining treatment); Rathbone-McCuan et al. 1976 (elderly); Mulford 1977; New York State Department of Mental Hygiene 1977; DJ Armor et al. 1978; Seelye 1979; Cronkite & Moos 1984; J Myers et al. 1984; Stabenau 1984; Helzer & Pryzbeck 1988; Blume 1990 (in treatment); Mandell et al. 1991:740 (unemployed persons); Harford 1992:932; KT Brady et al. 1993 (among substance abusers); Faraj et al. 1994; RC Kessler et al. 1994a; LA Warner et al. 1995; K Graham et al. 1996 (elderly); KM Fillmore et al. 1997; BF Grant 1997; Curran et al. 1999:827 (middle age); Holdcraft & Iacono 2002 **OCEANIA** *Australia*: TJ Jarvis 1992; *New Zealand*: RJM Crawford 1976 **INTERNATIONAL** *Multiple Countries*: Helzer et al. 1988:35 (4 out of 4 countries); Helzer et al. 1990:315 (5 out of 5 countries)	**ASIA** *Russia*: M Ryan 1995 **EUROPE** *Germany*: Brugger 1933; *Spain*: Alvarez & del Rio 1992; *Sweden*: Amark 1951; Kaij & Dock 1975; *Switzerland*: Bleuler 1955 **NORTH AMERICA** *United States*: JK Jackson & Connor 1953; Oltman & Friedman 1953; C Lewis et al. 1983; Stabenau 1984:1180; Hallman 1992 (type II); K Brady 1993:1708; Mullahy & Sindelar 1993; Caetano & Kaskutos 1995:560; D Dawson 1996b; CB Nelson et al. 1996; CA Prescott et al. 1999 (twins) **OCEANIA** *Australia*: Sargent 1979
No signif. difference						**NORTH AMERICA** *United States*: RW Jones & Helrich 1972 (treatment by physicians)	
Females more							

5.9.3.6. Genetic Predisposition to Alcoholism

Several twin and adoption studies have indicated that genetic factors contribute to alcoholism (e.g., McGue 1996; Prescott & Kendler 1996). One study sought to determine if a gender difference exists in this regard. It concluded that the extent to which male and female alcoholics are genetically predisposed to this addiction is essentially the same (Table 5.9.3.6).

Table 5.9.3.6. Genetic predisposition to alcoholism.

Nature of Any Difference						Postpubertal	
						Adult	
Males earlier							
No signif. difference						**NORTH AMERICA** *United States*: McGue et al. 1992	
Females earlier							

5.9.3.7. Age of Onset of Alcoholism

Studies that have sought to determine if the age male or female who are alcoholics begin to exhibit symptoms of alcoholism earlier have concluded that males are younger when they are so diagnosed (Table 5.9.3.7).

Table 5.9.3.7. Age of onset of alcoholism.

Nature of Any Difference						Postpubertal	Multiple Age Categories
						Adult	
Males earlier						**NORTH AMERICA** *United States*: Stabenau 1984; Beckman & Amaro 1986*; HE Ross 1989; CE Lewis et al. 1996; KM Fillmore et al. 1997	**NORTH AMERICA** *United States*: Beckman & Amaro 1986*; Blume 1990
No signif. difference							
Females earlier							

5.9.3.8. Alcohol Dependency Withdrawal Symptoms

A study of a specially developed strain of rats with a strong genetic proclivity to high alcohol intake concluded that when highly "addicted" animals were deprived of alcohol, males exhibited more severe withdrawal symptoms than did females (Table 5.9.3.8)

Table 5.9.3.8. Alcohol dependency withdrawal symptoms.

Nature of Any Difference							Multiple Age Categories
Males more							**RODENT** *Rat*: Devaud & Chadda 2001
No signif. difference							
Females more							

5.9.3.9. Addiction to Cocaine

Two studies of people who use cocaine concluded that females exhibit earlier tendencies to become addicted to this drug than do males. The same sex differences has been found among rats in the sense that females who are allowed to self-administer cocaine establish a more stable rate of administration early on than do males (the latter tend to "binge" administer cocaine at more irregular intervals; Table 5.9.3.9).

Table 5.9.3.9. Addiction to cocaine.

Nature of Any Difference						Postpubertal	
						Adult	
Males faster							
No signif. difference							
Females faster						**NORTH AMERICA** *United States*: SJ Robbins et al. 1999 (cocaine abusers); Singha et al. 2000 (self-reports, more reactive to the effects of cocaine) **RODENT** *Rat*: Lynch & Carroll 1999 (stable rate of self-administered low dosage); Carroll et al. 2002 (stable rate of self-administered low dosage); Hu et al. 2004 (stable rate of self-administered low dosage); Lynch & Taylor 2004 (stable rate of self-administered low dosage)	

5.9.4. Antisocial/Socially Disruptive Behavior

Behavior that puts others at risk of physical injury or emotional harm has been frequently investigated with regard to possible gender differences. The tables pertaining to these studies are presented below.

5.9.4.1. Conduct Disorders

The term *conduct disorder* refers to a variety of behavioral problems typically involving violence toward peers and often parents and teachers as well. Individuals who are diagnosed as exhibiting conduct disorders are often disrespectful toward others and unusually defiant of authority. Persons are most likely to receive a conduct disorder diagnosis in childhood, but symptoms often persist into adolescence and even adulthood. Table 5.9.4.1 shows that in many parts of the world, males are more likely to be diagnosed with conduct disorders than are females.

Table 5.9.4.1. Conduct disorders.

Nature of Any Difference	Prepubertal				Postpubertal		Multiple Age Categories
			Early Childhood	Childhood	Adolescent	Adult	
Males more			**NORTH AMERICA** *Canada*: Offord & Bennett 1994; *United States*: JC Anderson et al. 1987; P Cohen et al. 1993a:859*	**ASIA** *China*: Rutter et al. 1974:250; Ekblad, 1990:787 **EUROPE** *Britain*: Rutter et al. 1970:205; Graham & Rutter 1973; Leslie 1974*; Cochrane 1979:204 (West Indians, Indians, and Pakistanis living in Britian); Rushton et al. 1986; Rutter 1988; Thapar & McGuffin 1996:1113; Meltzer et al. 2000*; *Finland*: Pulkkinen 1983:138; Almqvist 1986:296; *Sweden*: Magnusson et al. 1975; Eley et al. 1999* (twins); *Netherlands*: Verhulst et al. 1990:424; Verhulst et al. 1997a*; *Norway*: Schulz Jorgensen et al. 1993; Backe-Hansen & Ogden 1996:340 **NORTH AMERICA** *Canada*: Offord et al. 1986:275; Marriage et al. 1986:688; Offord et al. 1987:834; Rae-Grant et al. 1989; Szatmari et al. 1989a; Offord et al. 1991; *United States*: Gilbert 1957; DR Peterson 1961; Frisk et al. 1966:132; ML Hoffman 1977; Widom 1977; Eme 1979:591; Cairns & Cairns 1984; Roff & Wirt 1984; Jary & Stewart 1985:11; N Richman et al. 1985a; Offord et al. 1986; Robins 1986:385; JC Anderson et al. 1987; P Cohen et al. 1987; Costello 1989; Kashani et al. 1989*; Gresham & Elliot 1990; Gabel & Shindledecker 1991; LN Robins et al. 1991:268; P Cohen et al. 1993a*; Lewinsohn et al. 1993*; Zoccolillo 1993* (aggressive conduct disorders); Loeber & Keenan 1994; EO Johnson et al. 1995:667; Comings 1995; Marcus & Betzer 1996; Webster-Stratton 1996; Ellickson et al. 1997:989; McDermott 1996; Lahey et al. 2000* **OCEANIA** *New Zealand*: JC Anderson et al. 1987; McGee et al. 1990; DM Fergusson et al. 1993; DM Fergusson & Horwood 1997:89 (teacher rated)	**EUROPE** *Britain*: SB Eysenck 1981:34; Meltzer et al. 2000*; *Netherlands*: Verhulst et al. 1997a*; *Norway*: Storvoll & Wichstrom 2002:1989 (self-report); *Sweden*: Eley et al. 1999* (twins) **NORTH AMERICA** *United States*: Kashani et al. 1989*; Bradley & Hood 1993 (twins); P Cohen et al. 1993a*; Lewinsohn et al. 1993* (older); Kazdin 1995; Costello et al. 1996; Simonoff et al. 1997; Lahey et al. 2000*; Biederman et al. 2002 (among ADHD patients) **OCEANIA** *New Zealand*: T Moffitt et al. 2001:42	**NORTH AMERICA** *Canada*: Offord et al. 1996 (young) *United States*: Dohrenwend & Dohrenwend 1976 (young); Luthar et al. 1996 (opiate abusers)	**EUROPE** *Britain*: Maughan & Rutter 1998; LN Robins et al. 1991:268
No signif. difference				**NORTH AMERICA** *United States*: Zoccolillo 1993* (non-aggressive conduct disorders)	**EUROPE** *Britain*: S Leslie 1974* **NORTH AMERICA** *United States*: Kashani et al. 1987; Lahey et al. 2000*; Zahn-Waxler 1993		
Females more							

5.9.4.2. Antisocial Behavior/Personality Disorder

Antisocial personality disorder (APD) is used to refer to an individual who tends to be extremely self-centered and exhibits callous disregard for the welfare of others. Other characteristics considered indicative of APD are a lack of emotional depth or conscience, extensive history of lying and deception, a grandiose sense of self-worth, and a parasitic lifestyle. Over the years, a variety of other terms have been used to refer to this condition, such as *moral imbecility*, *psychopathy*, and the *antisocial personality syndrome*. The diagnosis of APD is usually made in early adulthood or late adolescence.

As shown in Table 5.9.4.2, APD is much more characteristic of males than of females. The only qualification to this generalization is that the most widely used diagnostic instrument for measuring APD symptoms (called the Psychopathy Checklist), has been factor analyzed and found to contain two distinguishable (but still related) factors. It is the main factor (which refers to most of the traits identified above) that is largely exhibited by males. The second factor, which primarily has to do with failing to learn from adverse experiences, was not found to exhibit any significant gender differences in its average score, according to a Swedish study.

Table 5.9.4.2. Antisocial behavior/personality disorder.

Nature of Any Difference	Postpubertal	Multiple Age Categories
	Adult	
Males more	**EUROPE** *Denmark*: Cloninger et al. 1978; *Britain*: Edelmann & Vivian 1988:583; *Norway*: Torgersen et al. 2001 (community sample); *Sweden*: Halldin 1984:511; Strand & Belfrage 2001* (Part 1 of the Psychopathy Checklist) **MIDDLE EAST** *Israel*: Dohrenwend et al. 1992:949; Stueve & Link 1998 (self-completed questionnaire) **NORTH AMERICA** *Canada*: Hare 1980; Robins et al. 1984 Swanson et al. 1994; Forth et al. 1996; *United States*: Cloninger et al. 1975; Guze 1976; SA Mednick et al. 1975; Robins 1978:264; Cantwell 1981:22; Cadoret et al. 1984:3; J Fox 1984*; Robins et al. 1984; Coolidge et al. 1990; HJ Jackson et al. 1991 (psychiatric patients); Robins et al. 1991:265; Maier et al. 1992; L Fisher et al. 1993; Cottler et al. 1995; Grilo et al. 1996 (psychiatric patients); Torgersen et al. 2001 **OCEANIA** *New Zealand*: Mulder et al. 1994; Moffitt et al. 2001:42 (young)	**NORTH AMERICA** *United States*: Cloninger et al. 1973; J Fox 1984*; R Cairns & B Cairns 1988; Offord et al. 1991; Dishion et al. 1995; LS Bensley 1999a; R Marcus 1999
No signif. difference	**EUROPE** *Sweden*: Strand & Belfrage 2001* (Part 2 of the Psychopathy Checklist)	
Females more		

5.9.4.3. Oppositional Defiant Disorder

Oppositional defiant disorder (ODD), usually diagnosed according to *DSM* criteria, refers to extreme stubborness and tendencies not to obey parents and teachers. The findings of any gender differences in the prevalence of this disorder have been mixed (Table 5.9.4.3).

Table 5.9.4.3. Oppositional defiant behavior.

Nature of Any Difference	Prepubertal		Postpubertal
	Early Childhood	Childhood	Adolescent
Males more	**NORTH AMERICA** *United States*: RD Nixon 2002	**NORTH AMERICA** *United States*: Lahey et al. 2000; Biederman et al. 2002 (among ADHD patients)	**EUROPE** *Britain*: Earls 1994
No signif. difference	**NORTH AMERICA** *United States*: P Cohen et al. 1993a*		**NORTH AMERICA** *United States*: P Cohen et al. 1993a*
Females more			**NORTH AMERICA** *United States*: Latimer et al. 2002 (among substance abusers)

5.9.4.4. Discipline-Related/Problem Behavior

Studies have consistently found males to be more likely than females to exhibit behavior that falls outside of what most parents or guardians consider acceptable (Table 5.9.4.4).

Table 5.9.4.4. Discipline-related/problem behavior.

Nature of Any Difference	Prepubertal	Postpubertal
	Childhood	Adolescent
Males more	**NORTH AMERICA** *Canada*: Pagani et al. 2001:306 (in school); Masse & Tremblay 1999 (in school); *United States*: J Roberts & Baird 1972:6; Leinhardt et al. 1979; Achenbach & Edelbrock 1981:13*; Heatherington 1985 (acting out, among children of divorced parents); JA Stein et al. 1993	**NORTH AMERICA** *United States*: Achenbach & Edelbrock 1981:13*
No signif. difference		
Females more		

5.9.5. Disorders Involving Compulsive and Repetitive Actions

Behavior that is repeated over and over again, especially in social contexts, can be considered a psychological disorder. Findings pertaining to sex differences in the prevalence of such disorders are reviewed below.

5.9.5.1. Obsessive Compulsive Disorder in General

Table 5.9.5.1 summarizes research findings regarding sex differences in obsessive-compulsive disorder (OCD), a condition characterized by recurrent, intrusive thoughts (obsessions) and compulsions to perform certain ritualistic behaviors repeatedly. Among persons affected, both of these symptoms often consume large amounts of their waking hours, and usually cause anxiety and distress over time. Obsessive-compulsive disorder usually begins in adolescence or early adulthood and affects one to two percent of people in the United States.

As shown in the table, studies have been mixed with respect to any possible gender differences in proneness toward OCD, although males seem to exhibit more severe forms of the disorder. It is worth noting that in rats, males tend to exhibit more repetitive acts than do females, leading one research team to believe that an animal model of OCD may have been found (Ulloa et al. 2004:690).

Table 5.9.5.1. Obsessive compulsive disorder in general.

Nature of Any Difference					Postpubertal		Multiple Age Categories
					Adolescent	Adult	
More common among males					**NORTH AMERICA** *United States*: Flament et al. 1989	**EUROPE** *Norway*: Torgerson et al. 2001 (community sample) **NORTH AMERICA** *United States*: Golomb et al. 1995; JD Carter et al. 1999 (patients with depression)	**EUROPE** *Britain*: Lensi et al. 1996 (predominant and bizarre obsessions) **MIDDLE EAST** *Kuwait*: A Abdel-Khalek & Lester 2003* **NORTH AMERICA** *United States*: SA Rasmussen & Tsuang 1986 (more severe); Rasmussen & Eisen 1988* (predominant and bizarre obsessions); Ravizza et al. 1997 (greater severity of OCD); Fischer et al. 1997 (washing rituals/contamination fears); Karayiorgou et al. 1999 (persons with an unusual variant of the MAO-A gene); Camarena et al. 2001 (persons carrying an unusual variant of the MAO-A gene); Rosario-Campos et al. 2001 (greater severity of the disorder)
No signif. difference							**AFRICA** *South Africa*: Lochner et al. 2004* **EUROPE** *Britain*: Bebbington 1998 **NORTH AMERICA** *United States*: Rasmussen & Eisen 1992; A Abdel-Khalek & Lester 2003* **OCEANIA** *Australia*: Castle et al. 1995*
More common among females					**EUROPE** *Britain*: Castle et al. 1995*; Geller et al. 2001	**EUROPE** *Britain*: Castle et al. 1995*	**AFRICA** *South Africa*: Lochner et al. 2004:108* (engage in self-injury, among people with OCD) **EUROPE** *Britain*: RS Stern & Cobb 1978 (washing rituals); *Finland*: Lensi et al. 1996 (washing rituals); *Italy*: Bogetto et al. 1999 (washing rituals) **NORTH AMERICA** *United States*: Rasmussen & Eisen 1988* (washing rituals/contamination fears); Minichiello et al. 1990 (washing rituals/contamination fears); Weissman et al. 1994 (lifetime risk); Zohar et al. 1999 **OCEANIA** *Australia*: Castle et al. 1995* (washing rituals/contamination fears)

5.9.5.2. Age of Onset for Obsessive Compulsive Disorder

All studies located pertaining to the age of onset for obsessive-compulsive disorder have concluded that males begin to exhibit symptoms or are diagnosed at younger ages than are females (Table 5.9.5.2).

Table 5.9.5.2. Age of onset for obsessive compulsive disorder.

Nature of Any Difference	Citations
Males earlier	**AFRICA** *South Africa*: Lochner et al. 2004 (clinical sample) **EUROPE** *Britain*: Castle et al. 1995; *Italy*: Bogetto et al. 1999 **LATIN AMERICA** *Brazil*: Neziroglu et al. 1994 **NORTH AMERICA** *United States*: Karno et al. 1988*; Last & Strauss 1989; Rasmussen & Eisen 1990 (clinical sample); Swedo et al. 1989; Bellodi et al. 1992; SA Rasmussen & Eisen 1992; Hollander 1993; McElroy et al. 1993; Weissman et al. 1994; Thomsen 1995; Zohar 1999 **OCEANIA** *New Zealand*: MW Abbott 2001 (gambling)
No signif. difference	**NORTH AMERICA** *United States*: Karno et al. 1988* (community sample)
Females earlier	**NORTH AMERICA** *United States*: Weissman et al. 1994; Mundo et al. 1999; Geller et al. 2001

5.9.5.3. Hyperactive Sexual Desire Disorder

Studies of the diagnosis of unusually strong desires for sexual activity have all concluded that this condition is more prevalent among females than among males (Table 5.9.5.3). This conclusion seems at odds with evidence reviewed in Chapter 6 that males are more desirous of sex with numerous sex partners than are females. The seeming inconsistency may be explainable in terms of societal tolerance (or expectation) of such desires being stronger in men more than in women.

Table 5.9.5.3. Hyperactive sexual desire disorder.

Nature of Any Dif-ference					Postpubertal	
						Adult
More in males						
No signif. difference						
More in females						**EUROPE** *Denmark*: Ventegodt 1998 **NORTH AMERICA** *United States*: E Frank et al. 1978; Hawton & Catalan 1986; Rosen & Leiblum 1989; Segraves & Segraves 1991; O'Sullivan & Byers 1995

5.9.5.4. Pathological/Compulsive Gambling

Pathological or compulsive gambling is considered a behavior disorder in which individuals often become unable to resist the impulse to gamble. This form of addiction appears to affect 2 to 3 percent of most adult populations. According to Table 5.9.5.4, it is considerably more common among males than among females. The exceptional study was confined to the study of gamblers, among whom females seemed to move more rapidly from recreational gambling to pathological gambling than did males.

Table 5.9.5.4. Pathological/compulsive gambling.

Nature of Any Difference					Postpubertal		Multiple Age Categories
					Adolescent	Adult	
Males more					**NORTH AMERICA** *United States*: Lesieur & Klein 1987	**EUROPE** *Britain*: I Sommers 1988; *Spain*: Gonzalez-Ibanez et al. 2003; *Switzerland*: Bondolfi et al. 2000 **NORTH AMERICA** *Canada*: Ladouceur et al. 1994 (college); National Council of Welfare 1996; *United States*: Volberg & Steadman 1988; Volberg & Steadman 1989; Laundergan et al. 1990 (veterans); Volberg 1994; Hraba & Lee 1996; Volberg & Abbott 1997 (Caucasian and Native American veterans); National Research Council 1999; Petry 2000 (substance abusers); Potenza et al. 2001; Tavares et al. 2001*; J Welte et al. 2001; Ladd & Petry 2002; Welte et al. 2002; Westermeyer et al. 2002 (Native American veterans); Welte et al. 2004a; Welte et al. 2004b	**EUROPE** *Britain*: Sproston et al. 2000; *Sweden*: Volberg et al. 2001 **NORTH AMERICA** *United States*: Lesieur et al. 1986 (17-72 yrs, alcohol/drug patients); Black & Moyer 1998 (21-72 yrs); Cunningham-Willians et al. 1998 (18-96 yrs); Gerstein et al. 1999; National Research Council 1999; JE Grant & Kim 2002; Kaminer et al. 2002 (13-18 yrs, outpatient substance abusers) **OCEANIA** *Australia*: Productivity Commission 1999; *New Zealand*: Volherg & Abbott 1994; Abbott & Volberg 2001
No signif. difference						**NORTH AMERICA** *Canada*: J Powell et al. 1999:173; *United States*: Zitow 1996 (Native American veterans) **OCEANIA** *Australia*: Ohtsuka et al. 1997 (pathological gamblers)	**NORTH AMERICA** *United States*: Westermeyer et al. 2005 (Native American and Hispanic veterans)
Females more							**NORTH AMERICA** *United States*: Tavares et al. 2001* (develops faster among gamblers)

5.9.5.5. Age of Onset of Pathological/Compulsive Gambling

The age of onset of pathological or compulsive gambling appears to be earlier for males than for females (Table 5.9.5.5).

Table 5.9.5.5. Age of onset of pathological/compulsive gambling.

Nature of Any Difference					Postpubertal	
						Adult
Males earlier						**LATIN AMERICA** *Brazil*: Tavares et al. 2001 (pathological gamblers) **NORTH AMERICA** *United States*: RJ Rosenthal 1992 (pathological gamblers); Hraba & Lee 1996 (pathological gamblers)
No signif. difference						
Females earlier						

5.9.5.6. Tic Disorders in General

Tic disorders in general refer to the tendency of certain muscles to twitch more or less uncontrollably under a variety of conditions. The limited research has been confined to individuals diagnosed with obsessive compulsive disorders (OCD). One of these studies involved school age children and concluded that male OCD patients had higher rates of tics than did female OCD patients. However, a study of adult OCD patients found no significant sex difference in accompanying tics (Table 5.9.5.6).

Table 5.9.5.6. Tic disorders in general.

Nature of Any Difference	Prepubertal						Multiple Age Categories
				Childhood			
Males more				**NORTH AMERICA** *United States*: Eichstedt & Arnold 2001 (among OCD patients)			
No signif. difference							**AFRICA** *South Africa*: Lochner et al. 2004 (among OCD patients)
Females more							

5.9.5.7. Tourette's Syndrome

Tourette's syndrome is a neurological disorder characterized by tics in the face and sometimes elsewhere in the body. These tics are often accompanied by grunts and compulsive utterances (including obscenities). Symptoms usually begin in adolescence. Studies have shown that Tourette's syndrome is more often diagnosed in males than in females (Table 5.9.5.7).

Table 5.9.5.7. Tourette's syndrome.

Nature of Any Difference	Prepubertal						Multiple Age Categories
				Childhood			
Males more				**NORTH AMERICA** *United States*: Burd et al. 1986			**NORTH AMERICA** *United States*: KK Kidd et al. 1980; Nee et al. 1980; Pauls et al. 1981; Santangelo et al. 1994; BS Peterson et al. 2001
No signif. difference							
Females more							

5.9.6. Eating Disorders

A variety of eating disorders have been studied with respect to gender differences. Findings are reviewed in the tables below.

5.9.6.1. Eating Disorders in General

Eating disorders refer to tendencies to eat either insufficiently, improperly, or to intentionally regurgitate what one has consumed, with the typical goal of reducing one's weight. A widely used scale for measuring eating disorders is the Eating Disorder Inventory (EDI; Garner 1991). The two main eating disorders are anorexia nervosa and bulimia (both of which will also be considered separately). According to Table 5.9.6.1, females suffer from eating disorders to a greater degree than males. Prior literature reviews have estimated the female to male ratio to be approximately 3 to 1 (Hsu 1996; Hoerr 2002).

Table 5.9.6.1. Eating disorders in general.

Nature of Any Difference					Postpubertal		Multiple Age Categories
						Adult	
More in males							
No signif. difference							
More in females					**NORTH AMERICA** *United States*: DT Barry & Grilo 2002:339 (binge eating)	**NORTH AMERICA** *United States*: Cantrell & Ellis 1991; RL Spitzer et al. 1992 (binge eating); PK Peters et al. 1996 (young); M Seymour et al. 1997 (college); Braun et al. 1999; Woodside et al. 2001; DT Barry et al. 2002 (binge eating); Grilo 2002 (binge eating); Hoerr et al. 2002 (college)	**EUROPE** *Britain*: Bramon & Bosch et al. 2000:326 **NORTH AMERICA** *United States*: Carlat et al. 1997

5.9.6.2. Anorexia Nervosa

A person with anorexia nervosa severely restricts food intake and usually becomes extremely thin because of an intense fear of gaining weight and due to a distorted perception of their weight and body shape. All studies have concluded that females suffer more from anorexia nervosa than do males (Table 5.9.6.2). Most estimates are that about 90% of all anorexics are female (Haek et al. 2003).

Table 5.9.6.2. Anorexia nervosa.

Nature of Any Difference	Prepubertal				Postpubertal		Multiple Age Categories
			Early Childhood	Childhood	Adolescent	Adult	
More in males							
No signif. difference							
More in females			**EUROPE** *Britain*: Crisp et al. 1976*	**EUROPE** *Britain*: Crisp et al. 1976*; *Italy*: Miotto et al. 2002	**EUROPE** *Britain*: Crisp et al. 1976* **NORTH AMERICA** *United States*: MB Jones et al. 1980*; Pumariga et al. 1984; AR Lucas & Holub 1995; Keel et al. 1998	**EUROPE** *Britain*: HG Pope et al. 1984 (college, subclinical); *Germany*: Grabhorn et al. 2003 **NORTH AMERICA** *United States*: MB Jones et al. 1980* (young); Polivty & Herman 1985; Crisp & Burns 1990; Cantrell & Ellis 1991; Lucas et al. 1991; C Sharp et al. 1994	**AFRICA** *South Africa*: Lochner et al. 2004:107 (OCD patients) **EUROPE** *Britain*: Crisp et al. 1976*; Button & Whitehouse 1981 (subclinical); Crisp et al. 1986; *Italy*: Bogetto et al. 1999 (OCD patients); *Sweden*: Rastam et al. 1989 (urban) **NORTH AMERICA** *United States*: Szmukler 1985; Crisp & Burns 1990; Lucas et al. 1991 (over 90%); D Dunn 1992; C Sharp et al. 1994; Braun et al. 1999; Woodside et al. 2001

5.9.6.3. Bulimia

A bulimic has repeated episodes of binge eating (consuming large amounts of food in a short time) and then seeking to "correct" their over-eating by vomiting, using laxatives, fasting, or exercising excessively. As shown in Table 5.9.6.3, bulimia occurs distinctly more often in females.

Table 5.9.6.3. Bulimia.

Nature of Any Difference	Prepubertal				Postpubertal		Multiple Age Categories
				Childhood	Adolescent	Adult	
Males more							
No signif. difference							
Females more				**EUROPE** *Italy*: Miotto et al. 2002	**EUROPE** *France*: Choquet & Ledoux 1994 (survey); *Slovenia*: Tomori & Rus-Makovec 2000:363 (survey); *Switzerland*: Devaud et al. 1994 **NORTH AMERICA** *United States*: Flament et al. 1995; Ricardelli et al. 1998	**EUROPE** *Britain*: Pyle et al. 1983 (college, subclinical); Katzman et al. 1984 (college, subclinical); HG Pope et al. 1984 (college, subclinical); *Germany*: Grabhorn et al. 2003 **NORTH AMERICA** *Canada*: PR Garfinkel et al. 1995*; *United States*: Halmi et al. 1981; Pyle et al. 1983; MA Katzman et al. 1984; HG Pope et al. 1984; GT Wilson 1984; GR Leon et al. 1985; DM Zuckerman et al. 1986; Schotte & Standard 1987 (college); Carlat & Carmago 1991; PR Garfinkel et al. 1995; Soundy et al. 1995*; Woodside et al. 2001	**EUROPE** *Britain*: MB King 1986; MB King 1989 **NORTH AMERICA** *Canada*: PR Garfinkel et al. 1995*; *United States*: CG Fiarburn et al. 1986; Striegel-Moore et al. 1986; Soundy et al. 1995*; Braun et al. 1999; Joiner et al. 1999b

5.9.6.4. Age of Onset for Eating Disorders

Although anorexia, bulimia, and other eating disorders are more common in females, the age of onset for these disorders for both sexes tends to be during adolescence. As indicated in Table 5.9.6.4, there is either no significant gender difference in terms of the age or onset or females have a slightly earlier onset.

Table 5.9.6.4. Age of onset for eating disorders.

Nature of Any Difference	Citations
Males earlier	
No signif. difference	**NORTH AMERICA** *United States*: Fichter et al. 1985; Crisp & Burns 1990
Females earlier	**NORTH AMERICA** *United States*: C Sharp et al. 1994; Braun et al. 1999

5.9.6.5 Seeking Treatment for Eating Disorders

According to two studies, females are more likely than males to seek treatment for eating disorders (Table 5.9.6.5).

Table 5.9.6.5. Seeking treatment for eating disorders.

Nature of Any Difference	Citations
Males more	
No signif. difference	
Females more	**NORTH AMERICA** *United States*: Cachelin et al. 1999 (adult); Lewinsohn et al. 2002 (young adult)

5.9.7. Speech or Language Related Disorders

The ability to communicate through speech and to use language consisting of thousands of words appears to be unique to humans. Nevertheless, not all humans are equally capable of performing these communicative functions as others. Studies of possible sex differences in this regard are reviewed below.

5.9.7.1. Stuttering

All of the available research indicates that stuttering is more prevalent among males than among females (Table 5.9.7.1).

Table 5.9.7.1. Stuttering.

Nature of Any Difference	Prepubertal		Postpubertal	Multiple Age Categories
		Childhood	Adolescent	
Males more	**NORTH AMERICA** *United States*: Yairi & Ambrose 1992	**EUROPE** *Spain*: Azoy 1935 **NORTH AMERICA** *United States*: FJ Kelly & Berry 1931; R West et al. 1939*; Schuell 1946	**EUROPE** *Britain*: G Andrews & Harris 1964	**NORTH AMERICA** *United States*: JS Greene 1937; JF Bender 1938; R West et al. 1939*; JS Greene 1942; H Schnell 1946; Drayna et al. 1999
No signif. difference				
Females more				

5.9.7.2. Stuttering, Age of Onset

One study of stutterers reported the age of onset of stuttering symptoms. It concluded that males began to exhibit symptoms earlier than did females (Table 5.9.7.2).

Table 5.9.7.2. Stuttering, age of onset.

Nature of Any Difference	Prepubertal
	Early Childhood
Males earlier	**NORTH AMERICA** *United States*: Yairi & Ambrose 1992
No signif. difference	
Females earlier	

5.9.7.3. Speech Defects Other Than Stuttering

Speech defects other than stuttering include lisping along with other speech impediments. Research has consistently found such defects to be more prevalent among males than females (Table 5.9.7.3).

Table 5.9.7.3. Speech defects other than stuttering.

Nature of Any Difference	Prepubertal	Multiple Age Categories
	Childhood	
Males more	**NORTH AMERICA** *United States*: S Blanton 1916; White House Conference 1931; A Mills & Streit 1942; Milisen 1971	**NORTH AMERICA** *United States*: JJ Michaels & Goodman 1934 (ages 6-16, speech impediments)
No signif. difference		
Females more		

5.9.8. Stress-Related and Fear-Related Disorders

Sex differences in disorders that seem to be induced by stress or fear are reviewed in the following tables.

5.9.8.1. Post Traumatic Stress Disorder

Post traumatic stress disorder (PTSD) refers to having feelings of severe stress that appears to have been caused by an event that occurred months or even years earlier. As shown in Table 5.9.8.1, PTSD appears to affect females more. However, for military personnel, males exhibit higher rates than do females, probably due in large part to their experiencing direct combat more often.

Table 5.9.8.1. Post traumatic stress disorder.

Nature of Any Difference	Prepubertal				Postpubertal		Multiple Age Categories
				Childhood	Adolescent	Adult	
Males higher						**NORTH AMERICA** *United States*: Breslau et al. 1991a* (military); Willer & Grossman 1995 (military); Murdoch et al. 2003* (military)	**NORTH AMERICA** *United States*: FH Norris 1992 (military); RC Kessler et al. 1995* (military); Breslau et al. 1997* (military); MB Stein et al. 1997* (military); RC Kessler et al. 1999* (military)
No signif. difference						**MIDDLE EAST** *Israel*: SA Freedman et al. 2002 (among auto-crash survivors) **NORTH AMERICA** *United States*: RC Kessler et al. 1995*; Breslau et al. 1997* (among accident survivors); Murdoch et al. 2003* (among non-combat military personnel)	
Females higher				**NORTH AMERICA** *United States*: Vernberg et al. 1996 (following a hurricane); J March et al. 1997* (after an industrial fire); Korol et al. 1999* (after a nuclear waste disaster); Kaminer et al. 2000* (after experiencing violence)	**EUROPE** *Austria*: Curle & Williams 1996 (adjustment to PTSD) **NORTH AMERICA** *United States*: Giaconia et al. 1995 (older); MW Berton & Stabb 1996 (urban violence victims); J March et al. 1997* (after an industrial fire); Cuffe et al. 1998 (older); Lipschitz et al. 1999; Prigerson & Slimack 1999; Kaminer et al. 2000* (after experiencing violence); W Yule et al. 2000 (after a disaster experience); DJ Flannery et al. 2001 (exhibiting violent behavior)	**NORTH AMERICA** *Canada*: MB Stein et al. 2000; *United States*: Steinglass & Gerrity 1990 (natural disaster survivors); Breslau et al. 1991* (young); Breslau & Davis 1992 (young); RC Kessler et al. 1995*; Breslau et al. 1997* (young); CS North et al. 1997 (survivors of a mass shooting); Breslau et al. 1998; Stretch et al. 1998 (military); J Wolfe et al. 1999 (Gulf War veterans)	**NORTH AMERICA** *United States*: Helzer et al. 1987; JRT Davidson et al. 1991; Kendler et al. 1992; FH Norris 1992; Kessler et al. 1994a; Kessler et al. 1995; Breslau et al. 1997; MB Stein et al. 1997*; Breslau et al. 1998; Breslau et al. 1999; RC Kessler et al. 1999*; Korol et al. 1999* (ages 7-15); Breslau 2002

5.9.8.2. Stress and Anxiety Disorder in General

Greater proportions of females are diagnosed as suffering from general stress and anxiety disorders than are males, except during childhood where males seem to suffer more than females (Table 5.9.8.2).

Table 5.9.8.2. Stress and anxiety disorder in general.

Nature of Any Difference	Prepubertal	Postpubertal	Multiple Age Categories
	Childhood	Adult	
Males more	**NORTH AMERICA** *United States*: JC Anderson et al. 1987; EJ Costello 1989; P Cohen et al. 1993a; P Cohen et al. 1997b		
No signif. difference			
Females more	**NORTH AMERICA** *Canada*: Lautenbacher & Rollman 1993 (state anxiety)	**EUROPE** *Britain*: L Carpenter & Brockington 1980; *Germany*: Perkonigg et al. 2000; *Sweden*: Halldin 1985 **MIDDLE EAST** *Israel*: Levav et al. 1991; Ritsner et al. 1999; SA Freedman et al. 2002 (GAD, auto-crash survivors) **NORTH AMERICA** *Canada*: Offord et al. 1996; *United States*: Dohrenwend et al. 1980; WW Eaton et al. 1994 (panic and phobias); Kessler et al. 1994 (anxiety); MH Rapaport et al.1995; Sharan et al. 1996 (GAD, earthquake survivors); Kornstein 1997; Cummings et al. 2000 (stress about aging, ages 18-55); RC Silver et al. 2002 **INTERNATIONAL** *Several Industrial Countries*: Weissman & Klerman 1977a; Weissman & Klerman 1977b	**NORTH AMERICA** *United States*: RC Kessler et al. 1995; Breslau et al. 1998

5.9.8.3. Panic Disorder

A person with panic disorder experiences repeated, unexpected panic attacks; he/she also experiences persistent anxiety about a possible recurrence. The attack involves a period of intense fear, associated with a racing heart and shortness of breath. As documented by Table 5.9.8.3, panic disorders occur more often in females, from adolescence on.

Table 5.9.8.3. Panic disorder.

Nature of Any Difference	Postpubertal		Multiple Age Categories
	Adolescent	Adult	
Males more			
No signif. difference			
Females more	**EUROPE** *Hungary*: I Kecskes et al. 2002* **NORTH AMERICA** *United States*: Bradley & Hood 1993	**EUROPE** *Germany*: Maier & Buller 1988; *Hungary*: I Kecskes et al. 2002* **NORTH AMERICA** *United States*: Myers et al. 1984; RG Robinson et al. 1984; Weissman & Merikangas 1986; Reich et al. 1987; Sanderson et al. 1987; O Cameron & Hill 1989; PR Joyce et al. 1989; Katerndahl & Realini 1993; Yonkers et al. 1998* (panic attacks); Schmidt & Koselka 2000	**EUROPE** *Italy*: Barzega et al. 2001:192 **NORTH AMERICA** *United States*: Oei et al. 1990 (agoraphobia); Katon et al. 1991 (panic attacks); BJ Cox et al. 1993 (agoraphobia); Katerndahl & Realini 1993; W Maier et al. 1993a (relatives of persons with panic disorders); WW Eaton et al. 1994 (agoraphobia); RC Kessler et al. 1994a; Andrade et al. 1996 (panic attacks); Lydiard 1996 (panic attacks); Starcevic et al. 1998 (agoraphobia); MM Weissman et al. 1997; Gater et al. 1998; Reed & Witchen 1998; Yonkers et al. 1998* (agoraphobia); Sheikh et al. 2002

5.9.8.4. Phobias in General

Phobias are intense and persistent fears. As shown in Table 5.9.8.4, nearly all studies of phobias in general have concluded that females exhibit them to a greater degree than do males.

Table 5.9.8.4. Phobias in general.

Nature of Any Difference	Prepubertal				Postpubertal		Multiple Age Categories
				Childhood	Adolescent	Adult	
Males more							
No signif. difference				**NORTH AMERICA** *United States*: CC Strauss & Last 1993			
Females more					**NORTH AMERICA** *United States*: Abe & Masui 1981 ("simple phobia")	**EUROPE** *Britain*: SB Eysenck & Eysenck 1969 (young); IM Marks 1969; Crisp & Priest 1971; S Fisher & Hood 1988:315 (college) **NORTH AMERICA** *United States*: Bourdon et al. 1988; Regier et al. 1988; Yonkers & Ellison 1996	**EUROPE** *Britain*: Crown & Crisp 1966 (mental patients); IM Marks 1969; Crown et al. 1970; Finlay-Jones & Burvill 1977; Crisp et al. 1978 **NORTH AMERICA** *United States*: Frazier & Carr 1967; Agras et al. 1969; IM Marks 1969:446 (animal phobias); Mavissakalian & Michelson 1981; Uhlenhuth et al. 1983; JL Fox 1984; Bourdon et al. 1988; Lydiard 1996

5.9.8.5. Specific Phobias

Studies of phobias of specific objects or experiences have largely concluded that females exhibit them to a greater degree than males (Table 5.9.8.5).

Table 5.9.8.5. Specific phobias.

Nature of Any Difference	Prepubertal				Postpubertal		Multiple Age Categories
				Childhood	Adolescent	Adult	
Males more							
No signif. difference						**NORTH AMERICA** *United States*: SA Himle et al. 1989* (blood & injury)	
Females more				**NORTH AMERICA** *United States*: Aho & Erickson 1985 (hospitalization); JC Anderson et al. 1987* (social)	**NORTH AMERICA** *United States*: Fredrikson et al. 1996 (lightning, claustrophobia, darkness, heights, spiders, snakes)	**EUROPE** *Britain*: Geer 1965 (adult); *German*: Lautenbacher & Rollman 1993 (electrical shock) **NORTH AMERICA** *United States*: SA Himle et al. 1989* (animals, insects, choking, vomiting); Heikkila et al. 1999 (coronary angiography)	**EUROPE** *Britain*: IM Marks 1969:446 (animal phobias)

5.9.8.6. Social Anxiety Disorder

Studies of gender differences in social anxiety disorder (SAD) have all indicated that its prevalence is greater in females than in males (Table 5.9.8.6).

Table 5.9.8.6. Social anxiety disorder.

Nature of Any Difference					Postpubertal		Multiple Age Categories
					Adolescent	Adult	
Males more							
No signif. difference							
Females more					**EUROPE** *Italy*: Dell'Osso et al. 2002	**NORTH AMERICA** *United States*: FR Schneider et al. 1992; Weinstock 1999	**NORTH AMERICA** *United States*: Kessler et al. 1994a; Magee et al. 1996; Turk et al. 1998; Wittchen et al. 1999; Stein & Kean 2000; AJ Lang & Stein 2001

5.9.9. Other Psychological/Mental/Emotional Disorders

Below are reviewed findings from a number of tables pertaining to gender differences in several psychological, mental, or emotional disorders not already covered.

5.9.9.1. Behavior Problems/Behavioral Disorders in General

Terms such as "behavior problem" or "behavioral disorders" are obviously vague, but they have to do with an individual's ability to interact with others in a relatively harmonious way. Given the term's lack of precision, it is remarkable how consistent the research has been regarding the conclusion that such problems are more prevalent among males than among females (Table 5.9.9.1).

Table 5.9.9.1. Behavioral problems/disorders (in general).

Nature of Any Difference	Prepubertal	Postpubertal	
	Childhood	Adolescent	Adult
Males more	**EUROPE** *Britain*: J Cumming 1944 **NORTH AMERICA** *United States*: E Mathews 1923; Haggerty 1925; Wickman 1928; LJ Epstein 1941; CR Rogers 1942; C Ullman 1952; Glidewell et al. 1957*; Beilin 1959; Goldfarb 1963 (teacher assessment); Glidewell 1968 (mother's assessment); Gove & Herb 1974	**NORTH AMERICA** *United States*: HD Williams 1933 (in school); Latimer et al. 2002 (among substance abusers)	**NORTH AMERICA** *United States*: HH Fernandez et al. 2000 (among Parkinson's disease patients)
No signif. difference	**NORTH AMERICA** *United States*: J MacFarlane et al. 1954		
Females more			

5.9.9.2. Attention Deficit Hyperactivity Disorder/Hyperactivity

Table 5.9.9.2 summarizes findings concerning sex differences in a disorder that affects as many as 10 percent of all children in Western countries. Formerly known as hyperactivity and hyperkinesias, attention deficit hyperactivity disorder (ADHD) is characterized by very short attention spans and very high levels of activity. ADHD is usually diagnosed by a psychologist or psychiatrist, but the opinions of parents and teachers are usually relied upon heavily in identifying most affected children.

Starting at early childhood age, every study located has concluded that ADHD is much more common among males than among females, usually by margins of 4 or 5 to 1. The high proportion of males with ADHD relative to females is consistent with generalizations reached in reviews by RA Barkley (1998) and Lahey et al. (1999), and with a conventional meta-analysis by Gershon (2002).

Table 5.9.9.2. Attention deficit hyperactivity disorder/hyperactivity.

Nature of Any Difference	Prepubertal		Postpubertal	Multiple Age Categories
	Early Childhood	Childhood	Adolescent	
Males more	**NORTH AMERICA** *United States*: Beller & Neubauer 1963 (parent report); Love & Thompson 1988*; SB Campball 1990; Bhatia et al. 1991; P Cohen et al. 1993a:858*	**EUROPE** *Germany*: Minde 1985; *Norway*: Backe-Hansen & Ogden 1996:338 **LATIN AMERICA** *Columbia*: Brewis et al. 2001* **NORTH AMERICA** *Canada*: Szatmari et al. 1989b; Cote et al. 2002; Cote et al. 2002b; *United States*: Stewart 1970:97; Battle & Lacey 1972*; J Roberts & Baird 1972:7; Cantwell 1977; Kashani et al. 1979; Achenbach & Edelbrock 1981:14*; Pelham & Bender 1982; deHaas & Young 1984; Befera & Barkley 1985; CA Berry et al. 1985 (ADD); deHaas 1986; JC Anderson et al. 1987; Breen & Barkley 1988; Love & Thompson 1988*; A Barkley 1989; Breen 1989; Horn et al. 1989; Whalen 1989; Breen & Altepeter 1990; RT Brown et al. 1991; Hinshaw 1992a; Hinshaw 1992b; Hinshaw 1994; Lahey et al. 1994*; LE Arnold 1996; Gaub & Carlson 1997*; Rhee et al. 1999; Brewis et al. 2001*; Milich et al. 2001; Biederman et al. 2002; Rhee & Waldman 2004 **OCEANIA** *Australia*: R Gomez et al. 1999	**EUROPE** *Estonia*: Merenakk et al. 2003:1510 (teacher rating) **NORTH AMERICA** *United States*: Battle & Lacey 1972*; Achenbach & Edelbrock 1981:14*; P Cohen et al. 1993:858* (young); Lahey et al. 1994*; Luthar et al. 1996:182 (opiate addicts, retrospective childhood recollections); Latimer et al. 2002 (among substance abusers); RJ Turner & Gil 2002	**NORTH AMERICA** *United States*: Offord et al. 1989:259 (adolescents & childhood longitudinal study); Gaub & Carlson 1997* (diagnosed); Arcia & Conners 1998 (diagnosed)
No signif. difference				
Females more				

5.9.9.3. Attention Deficit Disorder

A psychological condition that is closely related to ADHD is known as attention deficit disorder (ADD). ADD differs from ADHD primarily in the sense of involving a lack of attention but little evidence of hyperactivity and the accompanying difficulties with parents and peers (Gaub & Carlson 1997:1038). Table 5.9.9.3 indicates that, as with ADHD, ADD is considerably more common among boys than among girls, although more in the range of a 2 or 3 to 1 ratio (Biederman et al. 2002).

Table 5.9.9.3. Attention deficit disorder.

Nature of Any Difference	Prepubertal				Postpubertal
	Infant	Toddler	Early Childhood	Childhood	Adolescent
Males more	**EUROPE** *Britain*: Wing 1981a*	**EUROPE** *Britain*: Wing 1981a*	**EUROPE** *Britain*: Wing 1981a*	**EUROPE** *Britain*: Rutter et al. 1975; Wing 1981a* **NORTH AMERICA** *United States*: CA Berry et al. 1985 August et al. 1992	**EUROPE** *Britain*: Wing 1981a*
No signif. difference					
Females more					

5.9.9.4 Autism and Asperger Syndrome

Autism is associated with impairment of one's ability to socialize and communicate with others. The condition is usually diagnosed in children by age 4 and is typified by a seeming self-absorbed focus on sensory non-social aspects of one's environment. As a result, children with autism are extremely slow in developing any language capabilities and function poorly in school. It is one of the most common developmental disabilities and appears to be increasing in several industrialized countries (where reliable statistics on prevalence are maintained). Current estimates are that 10 to 20 children out of every 10,000 will be diagnosed with autism or a milder form of the condition known as Asperger syndrome. As shown in Table 5.9.9.4, both of these conditions are distinctly higher in males (usually by a factor of 4 or 5 to 1) than in females. At least two reviews have also reached the conclusion that males are more often affected by autism and Asperger syndrome than females (Eme 1979; Lotter 1966).

Table 5.9.9.4. Autism and Asperger syndrome.

Nature of Any Difference	Prepubertal			Postpubertal		Multiple Age Categories
	Toddler	Early Childhood	Childhood	Adolescent	Adult	
Males more	**EUROPE** *Britain*: Rutter & Lockyer 1967; Tsai & Beisler 1983; Swettenham et al. 1998	**ASIA** *Japan*: Sugiyama & Abe 1989 **NORTH AMERICA** *Canada*: Bryson et al. 1988*; *United States*: Kanner 1960; Lotter 1966; Hingtgen et al. 1972; Rutter 1978; Schopler 1978; TD Baird & August 1985; Lord & Schopler 1987; G Baird et al. 2000; Chakrabarti & Fombonne 2001	**EUROPE** *France*: Fombonne et al. 1997; *Sweden*: Gillberg & Wing 1999 **NORTH AMERICA** *Canada*: Bryson et al. 1988*; *United States*: L Wing 1981b (autism); Volkman et al. 1993; JH Miles & Hillman 2000; J Bertrand et al. 2001; Croen et al. 2002; Yeargin-Allsopp et al. 2003 (urban); JL Stone et al. 2004	**EUROPE** *Britain*: Rutter & Garmezy 1983	**EUROPE** *Britain*: Baron-Cohen & Wheelwright 2003	**NORTH AMERICA** *United States*: Lord et al. 1982; Folstein & Rosen-Sheidley 2001
No signif. difference						
Females more						

5.9.9.5. Dissociative Disorder/Dissociative Thinking

Dissociation has been described as a tendency to "uncouple" one's sense of self over time or place (Meares 1989). The types of questions used to measure dissociative thinking pertain to "finding oneself in a place without knowing how one got there" and "feeling as though one's body is someone else's" (Seedat et al. 2003:117). When these types of feelings actually become reality in the minds of an individual, he/she is said to have a dissociative disorder.

Findings pertaining to gender differences in dissociative thinking have been mixed. Basically, most studies based on various subsamples of a general population have concluded that such thinking is more common in females than in males, while community-wide samples have found either no differences or higher rates among males (Table 5.9.9.5).

Table 5.9.9.5. Dissociative disorder/dissociative thinking.

Nature of Any Difference	Postpubertal
	Adult
Males more	**NORTH AMERICA** *United States*: Seedat et al. 2003 (community sample)
No signif. difference	**NORTH AMERICA** *Canada*: CA Ross et al. 1990; Grabe et al. 1999
Females more	**MIDDLE EAST** *Turkey*: Tutkun et al. 1998 (patients at a university clinic) **NORTH AMERICA** *United States*: Putnam et al. 1996; Dunn et al. 1998 (substance abuse patients); Aderibigbe et al. 2001 (rural population)

5.9.9.6. Enuresis

Enuresis involves difficulty preventing urination particularly when asleep. Obviously, enuresis is found in all young children, but most youngsters are able to avoid wetting their beds throughout the night at least by age five. According to the located studies, there is either no gender difference, or males exhibit more enuresis than do females (Table 5.9.9.6).

Table 5.9.9.6. Enuresis.

Nature of Any Difference	Prepubertal	Postpubertal	Multiple Age Categories
	Early Childhood	Adolescent	
Males more	**NORTH AMERICA** *United States*: Michaels & Goodman 1934* (beyond age 3)	**NORTH AMERICA** *United States*: LI Oliver 1974:6 (young)	
No signif. difference	**NORTH AMERICA** *United States*: Hattwick 1937		**NORTH AMERICA** *United States*: JJ Michaels & Goodman 1934* (ages 6-16)
Females more			

5.9.9.7. Gender Identity Disorder (GID)

Gender identity disorder (GID) refers to persons who believe that his or her true sex from a mental and emotional perspective does not correspond to his or her apparent anatomical sex. According to Table 5.9.9.7, all the studies indicate that this disorder occurs more often in males than in females.

Table 5.9.9.7. Gender identity disorder (GID).

Nature of Any Difference	Prepubertal	Postpubertal		Multiple Age Categories
	Childhood	Adolescent	Adult	
More prevalent in males	**NORTH AMERICA** *Canada*: Zucker & Bradley 1995; *United States*: R Green 1977; RF Eme 1979:591	**NORTH AMERICA** *United States*: Allport 1937	**NORTH AMERICA** *United States*: Green 1974; Pauly 1974	**EUROPE** *Netherlands*: Bakker et al. 1993
No signif. difference				
More prevalent in females				

5.9.9.8. Hysteria

Hysteria is known as somatization disorder or conversion disorder, depending on the specific symptoms displayed. Diagnostic criteria include emotionally laden mental conflicts appearing as physical symptoms. According to the studies cited in Table 5.9.9.8, there seem to be no sex differences in this area.

Table 5.9.9.8. Hysteria.

Nature of Any Dif-ference	Postpubertal	Multiple Age Categories
	Adult	
Males more		
No signif. difference	**EUROPE** *Britain*: Crisp & Priest 1971; R Howell et al. 1973 (college); Stringer et al. 1978:227 (college)	**EUROPE** *Britain*: Crown & Crisp 1970
Females more		

5.9.9.9. Psychoticism

Psychoticism should not be confused with either *psychopathy* or *psychosis*. As Eysenck use the term, *psychoticism* refers to a personality/mental disorder typified by aggressiveness and interpersonal hostility (Claridge 1983; Eysenck & Nias 1978:239). The term *psychopathy*, on the other hand, refers to aspects of a clinically diagnosed mental illness. Studies of sex differences in psychoticism have all indicated that this condition is more characteristic of males than of females (Table 5.9.9.9).

Table 5.9.9.9. Psychoticism.

Nature of Any Dif-ference	Prepubertal				Postpubertal		
				Childhood	Adolescent	Adult	
Males higher				**EUROPE** *Britain*: SB Eysenck et al. 1993*; SB Eysenck 1994:203* **MIDDLE EAST** *Iran*: SB Eysenck 1994:203* **NORTH AMERICA** *Canada*: SB Eysenck et al. 1993*	**EUROPE** *Britain*: DL Smith 1996:1063	**EUROPE** *Britain*: DA Clark et al. 1987:7 (young); Sanderman et al. 1991; Faith et al. 2001 **NORTH AMERICA** *Canada*: JD Parker et al. 1989:601 (young); *United States*: Zuckerman & Litle 1986 (young); Zuckerman 1971 (young) **OCEANIA** *Australia*: Heaven 1993:70 (young) **INTERNATIONAL** *Multiple Countries*: Lynn & Martin 1997 (37 out of 37 countries)	
No signif. difference							
Females higher							

Chapter 6

PREFERENCES, INTERESTS, ATTITUDES, BELIEFS, AND INTENTIONS

In this chapter, the results of studies of sex differences surrounding a wide array of preferences, interests, attitudes, and beliefs are summarized. A few tables are also devoted to sex differences in stated intentions. Relative to most other chapters, the present chapter contains few citations to studies of nonhumans.

6.1

SENSORY PREFERENCES

Quite a number of studies have sought to determine if one sex prefers certain types of visual, auditory, gustatory, olfactory, or tactile stimuli more than the other sex. The results from these studies are reviewed in the tables below.

6.1.1. Gustatory and Olfactory Preferences

Gustatory and olfactory preferences are those having to do with taste and smell. The tables included in this section are about the only ones in the present chapter which contains citations to studies of nonhuman subjects.

6.1.1.1. Preference for Sweet Tastes or Saccharin Flavor

As shown in Table 6.1.1.1, female rodents appear to have a greater preference for sweet tastes than do their male counterparts. For humans, the evidence for any sex difference is less clear, since some seem to suggest that among infants, there may be little difference, or females may have a greater preference, whereas among adults males seem to prefer sweet tastes more than do females.

Table 6.1.1.1. Preference for sweet tastes or saccharin flavor.

Nature of Any Difference	Prepubertal				Postpubertal		Multiple Age Categories
	Infant				Adolescent	Adult	
Males more					**NORTH AMERICA** *United States*: Desor et al. 1983; Monneuse et al. 1991	**NORTH AMERICA** *United States*: Enns et al. 1979	**NORTH AMERICA** *United States*: Panghorn & Simone 1958; Desor et al. 1975a; MT Conner et al. 1986; MT Conner & Booth 1988
No signif. difference	**NORTH AMERICA** *United States*: Dubignon et al. 1969 (newborn); Desor et al. 1975b						
Females more	**NORTH AMERICA** *United States*: Nisbett & Gurwitz 1970 (newborn)				**RODENT** *Rat*: Wade & Zucker 1969*	**RODENT** *Hamster*: I Zucker et al. 1972; *Rat*: Valenstein et al. 1967; Valenstein et al. 1967a&b; Wade & Zucker 1969*; I Zucker 1969; BH Shapiro & Goldman 1973; Nance et al. 1976; McGivern et al. 1984a; Lichtensteiger & Schlumpf 1985; Sclafani et al. 1987	

6.1.1.2. Preference for Bitter Tastes

Table 6.1.1.2 suggests that among rats, females are more inclined than males to consume what humans consider bitter tasting substances.

Table 6.1.1.2. Preference bitter tastes.

Nature of Any Difference					Postpubertal	
						Adult
Males more						
No signif. difference						
Females more						**RODENT** *Rat*: Wade & Zucker 1970 (young); Nance et al. 1976 (young)

6.1.1.3. Preference for Salty Tastes

According to Table 6.1.1.3 sex differences in salt preferences among rodents fluctuate with age. For humans, the one available study suggests that males prefer saltier tasting foods than do females.

Table 6.1.1.3. Preference for salty tastes.

Nature of Any Difference	Prepubertal				Postpubertal	
				Childhood	Adolescent	Adult
Males more					**RODENT** *Rat*: Krecek et al. 1972*	**NORTH AMERICA** *United States*: Frye & DeMolar 1994
No signif. difference				**RODENT** *Rat*: Krecek et al. 1972*		
Females more						**RODENT** *Rat*: Krecek 1973

6.1.1.4. Preference for Sour Tastes

Only one study was located that compared the sexes regarding preferences for sour tastes. As shown in Table 6.1.1.4, it suggested that females liked sour tastes more than did males.

Table 6.1.1.4. Preference for sour tastes.

Nature of Any Difference							Multiple Age Categories
Males more							
No signif. difference							
Females more							**NORTH AMERICA** *United States*: Langwell 1949

6.1.1.5. Preference for Fatty Dairy Products

Two studies have compared human males and females regarding their preference for various fatty diary products. As shown in Table 6.1.1.5, the conclusions have been inconsistent.

Table 6.1.1.5. Preference for fatty dairy products.

Nature of Any Difference					Postpubertal		Multiple Age Categories
					Adolescent		
Males more							**ASIA** *Japan*: Nakamura et al. 2001:3
No signif. difference							
Females more					**NORTH AMERICA** *United States*: Monneuse et al. 1991		

6.1.1.6. Preference for the Taste of Calcium

Calcium is an essential nutrient for animals. Despite the greater need for calcium by females especially during pregnancy and following menopause, no evidence was found of a significant gender difference in this preference (Table 6.1.1.6).

Table 6.1.1.6. Preference for the taste of calcium

Nature of Any Difference						Postpubertal
						Adult
Males more						
No signif. difference						**MIDDLE EAST** *Israel*: Leshem et al. 2003 (young)
Females more						

6.1.1.7. Preference for Alcohol

Studies of sex differences in rat preferences for alcohol typically involve making two beakers of liquid available to animals (plain water and water laced with 10 to 20% alcohol). As shown in Table 6.1.1.7, the available research has found females exhibiting a greater preference for alcohol-laced water when compared to males.

Table 6.1.1.7. Preference for alcohol.

Nature of Any Difference						Postpubertal
						Adult
Males more						
No signif. difference						
Females more						**RODENT** *Rat*: Lancaster et al. 1996 (females pair fed non-alcoholic beer as juveniles greater preference for alcohol as adults); Juarez & Barrios de Tomasi 1999 (preference for alcohol in a free choice)

6.1.1.8. Number of Foods Disliked

According to the two studies cited in Table 6.1.1.8, adult human females dislike a greater number of foods than do males.

Table 6.1.1.8. Number of foods disliked.

Nature of Any Difference						Postpubertal
						Adult
Males more						
No signif. difference						
Females more						**NORTH AMERICA** *United States*: Tussing 1939 (young); R Wallen 1943

6.1.2. Color Preferences

Sex differences in color preferences have been studied in various ways over the years. Findings are summarized in the following section.

6.1.2.1. Having a Favorite Color in General

People not only vary in terms of the sort of color they identify as their favorite, but they also vary in terms of even having a favorite. Table 6.1.2.1 indicates that females are more likely than males to assert that they have a favorite color.

Table 6.1.2.1. Having a favorite color in general.

Nature of Any Difference							Multiple Age Categories
Males more							
No signif. difference							
Females more							**NORTH AMERICA** *United States*: Radeloff 1990

6.1.2.2.Aspects of Colors Preferred

A couple of studies have explored sex differences in people's preferences for various features of their color preferences. Table 6.1.2.2 suggests that no generalization is currently warranted concerning these features.

Table 6.1.2.2. Aspects of colors preferred.

Nature of Any Difference	Postpubertal	Multiple Age Categories
	Adult	
Males more		**NORTH AMERICA** *United States*: Radeloff 1990* (bright colors)
No signif. difference		**NORTH AMERICA** *United States*: Radeloff 1990* (light colors)
Females more	**NORTH AMERICA** *United States*: Spiegel & Keith-Spiegel 1971 (college, bright & highly saturated colors)	**NORTH AMERICA** *United States*: Radeloff 1990* (soft colors)

6.1.2.3. Preference for Black

No conclusion is currently warranted regarding any gender difference in preferences for the color black (Table 6.1.2.3).

Table 6.1.2.3. Preference for black.

Nature of Any Difference	Postpubertal
	Adult
Males more	
No signif. difference	**NORTH AMERICA** *United States*: L Ellis & Ficek 2001:1377 (college, favorite color)
Females more	**NORTH AMERICA** *United States*: NC Silver & Ferrante 1995 (elderly)

6.1.2.4. Preference for Blue

Most studies have revealed that males have a stronger preference for blue than do females. (Table 6.1.2.4).

Table 6.1.2.4. Preference for blue.

Nature of Any Difference	Prepubertal	Postpubertal		Multiple Age Categories
	Childhood	Adolescent	Adult	
Males more	**ASIA** *India*: Sinha et al. 1971; *Japan*: Garth et al. 1931:400 Minamoto 1985 **MIDDLE EAST** *Israel*: Fischer 1988; Passig & Levin 2000 (young)	**ASIA** *India*: Sinha et al. 1970	**NORTH AMERICA** *United States*: NC Silver et al. 1988 (young); NC Silver & Ferrante 1995 (elderly); L Ellis & Ficek 2001:1377 (college, favorite color)	**ASIA** *India*: Krishna 1972 (blue & indigo) **NORTH AMERICA** *United States*: Luckiesh 1927; Poffenberger 1928
No signif. difference				
Females more				**ASIA** *India*: Krishna 1972 (violet)

6.1.2.5. Preference for Green

Findings concerning sex differences in preferences for the color green have been somewhat inconsistent although most suggest that males prefer this color more than females do (Table 6.1.2.5).

Table 6.1.2.5. Preference for green.

Nature of Any Difference	Prepubertal	Postpubertal
	Childhood	Adult
Males more	**ASIA** *Japan*: Minamoto 1985 **MIDDLE EAST** *Israel*: Fischer 1988; Passig & Levin 2000 (young)	**NORTH AMERICA** *United States*: Spiegel & Keith-Spiegel 1971 (college)
No signif. difference		
Females more		**NORTH AMERICA** *United States*: L Ellis & Ficek 2001:1377 (college, favorite color)

6.1.2.6. Preference for Pink

Studies have shown that females are more likely than males to prefer the color pink (Table 6.1.2.6).

Table 6.1.2.6. Preference for pink.

Nature of Any Difference	Postpubertal	Multiple Age Categories
	Adult	
Males more		
No signif. difference		
Females more	**NORTH AMERICA** *United States*: NC Silver & Ferrante 1995 (elderly); L Ellis & Ficek 2001:1377 (college, favorite color)	**NORTH AMERICA** *United States*: Luckiesh 1927; Poffenberger 1928

6.1.2.7. Preference for Purple

According to one study, a greater proportion of females than males consider purple their favorite color (Table 6.1.2.7).

Table 6.1.2.7. Preference for purple.

Nature of Any Difference	Postpubertal
	Adult
Males more	
No signif. difference	
Females more	**NORTH AMERICA** *United States*: L Ellis & Ficek 2001:1377 (college, favorite color)

6.1.2.8. Preference for Red

Findings have been inconsistent with regard to any gender differences in preferences for the color red (Table 6.1.2.8).

Table 6.1.2.6. Preference for pink.

Nature of Any Difference	Prepubertal	Postpubertal
	Childhood	Adult
Males more		**NORTH AMERICA** *United States*: NC Silver & Ferrante 1995 (elderly)
No signif. difference		**NORTH AMERICA** *United States*: L Ellis & Ficek 2001:1377 (college, favorite color)
Females more	**ASIA** *Japan*: Garth et al. 1931:400 (favorite color); Minamoto 1985 **MIDDLE EAST** *Israel*: Fischer 1988	

6.1.2.9. Preference for Yellow

Table 6.1.2.9 shows that one study suggested that females exhibited a stronger preference for yellow than did males

Table 6.1.2.9. Preference for yellow.

Nature of Any Difference	Prepubertal
	Childhood
Males more	
No signif. difference	
Females more	**MIDDLE EAST** *Israel*: Fischer 1988 (yellow)

6.1.3. Preferences for Stimuli (Other Than Color)

Sex differences in preferences having to do with specific types of stimuli other than color are summarized below.

6.1.3.1. Preference for Familiar Stimuli

When it comes to familiar olfactory stimuli, a study cited in Table 6.1.3.1 found that infant females have a stronger preference.

Table 6.1.3.1. Preference for familiar stimuli.

Nature of Any Difference	Prepubertal
	Infant
Males stronger	
No signif. difference	
Females stronger	**NORTH AMERICA** *United States*: Balogh & Porter 1986 (olfactory)

6.1.3.2. Preference for Complex (as Opposed to Simple) Visual Stimuli

Table 6.1.3.2 suggests that male children have a stronger preference for complex visual stimuli than do female children.

Table 6.1.3.2. Preference for complex (as opposed to simple) visual stimuli.

Nature of Any Difference	Prepubertal	
	Early Childhood	Childhood
Males stronger	**NORTH AMERICA** *United States*: Witryol et al. 1968; Wentworth & Witryol 1984	**NORTH AMERICA** *United States*: Cuvo & Witryol 1971; AB Werner & Witryol 1988
No signif. difference		
Females stonger		

6.1.3.3. Preference for Round (vs. Angular) Shapes

Two studies were located concerning sex differences in preferences for round as opposed to angular shapes. As shown in Table 6.1.3.3, these studies reached contradictory conclusions.

Table 6.1.3.3. Preference for round (vs. angular) shapes.

Nature of Any Difference	Prepubertal	Postpubertal
	Childhood	Adolescent
Males more	**EUROPE** *Britain*: McElroy 1954	
No signif. difference		
Females more		**AFRICA** *South Africa*: Jahoda 1956 (Accra Tribe)

6.1.3.4. Habituation to Visual Stimuli in General

Studies have been inconsistent with respect to discovering sex differences in the tendency of young children to habituate (or satiate) to visual stimuli. According to Table 6.1.3.4, most studies have failed to find any significant differences between young males and females in the amount of time they spend looking at an object before moving on to other objects.

Table 6.1.3.4. Habituation to visual stimuli in general.

Nature of Any Difference	Prepubertal	
	Infant	Toddler
Males more rapid	**NORTH AMERICA** *United States*: Pancratz & Cohen 1970; LB Cohen et al. 1971; LB Cohen 1973; Cornell & Strauss 1973; LB Cohen et al. 1975	
No signif. difference	**NORTH AMERICA** *Canada*: Creighton 1984: *United States*: Bartoshuk 1962; Keen 1964; J Kagan & Lewis 1965; Caron & Caron 1968; S Friedman et al. 1970a&b; RB McCall & Kagan 1970; S Friedman & Carpenter 1971; WK Berg 1972; S Friedman 1972; Caron et al. 1973; DJ Greenberg et al. 1973; RB McCall 1973; RB McCall et al. 1973; Wetherford & Cohen 1973; WK Berg 1974; CJ Brown 1974; RM Martin 1975; Adkinson & Berg 1976; Bornstein 1976; DeLoache 1976; LB Cohen et al. 1977; RB McCall et al. 1977; Young-Browne et al. 1977	**NORTH AMERICA** *United States*: D Johnson & Brody 1977; Steele & Pederson 1977
Females more rapid	**NORTH AMERICA** *United States*: Meyers & Cantor 1966; Meyers & Cantor 1967; Caron & Caron 1969 (complex stimuli); Caron et al. 1971:288 (visual satiation); S Friedman et al. 1974; Stamps & Porges 1975; Creighton 1984	

6.1.3.5. Preference for/Attention Given to Faces (as Opposed to Inanimate Objects)

Several studies of human infants have concluded that females spend more time looking at faces of adult humans than at objects with no recognizable human appearances (Table 6.1.3.5). The eyes seem to be an especially attractive feature to females. The one study that reported the opposite conclusion used grouped images of same-sex human faces rather than individual faces.

Table 6.1.3.5. Preference for/attention given to faces (as opposed to inanimate objects)

Nature of Any Difference	Prepubertal					Postpubertal	
	Infant					Adult	
Males more	**NORTH AMERICA** *Canada*: Benenson et al. 2004* (group images)						
No signif. difference							
Females more	**EUROPE** *Britain*: Connellan et al. 2000 (neonate); Lutchmaya & Baron-Cohen 2002; Lutchmaya et al. 2002a; *Wales*: Bayliss et al. 2005 **NORTH AMERICA** *Canada*: Benenson et al. 2004* (individual images); *United States*: M Lewis et al. 1966b (staring at the faces of others); Leinbach & Fagot 1993:330; PC Quinn et al. 2002 (3-4 month-olds)					**EUROPE** *Britain*: Driver et al. 1999	

6.1.3.6. Preference for/Attention Given to Inanimate Objects (Rather Than Faces)

One study of newborns found that boys spent more time than girls looking at an inanimate object than at human faces (Table 6.1.3.6).

Table 6.1.3.6. Preference for/attention given to inanimate objects (rather than faces)

Nature of Any Difference	Prepubertal					
	Infant					
Males more	**EUROPE** *Britain*: Connellan et al. 2000 (neonate, mobiles)					
No signif. difference						
Females more						

6.1.3.7. Feeling Disgust Toward Bodily Waste

One study found females expressing greater disgust than males did with regard to bodily waste products such as urine and feces (Table 6.1.3.7).

Table 6.1.3.7. Feeling disgust toward bodily waste.

Nature of Any Difference						Multiple Age Categories
Males more						
No signif. difference						
Females more						**NORTH AMERICA** *United States*: Templer et al. 1984

6.2
BROAD RANGING PREFERENCES, DESIRES, AND INTERESTS

Below, a substantial number of widely ranging preferences, desires, and interests are explored with respect to possible sex differences.

6.2.1. Basic Non-Social Preferences, Desires, and Interests

Preferences, desires, and interests of a basically non-social nature are given consideration in the subsections below.

6.2.1.1. Masculine (as Opposed to Feminine) Interests and Preferences

Masculine interests and preferences are defined as those that are commonly believed to characterize males. A typical example would be interest in sport, especially sport that involves physical contact such as boxing. Feminine interests and preferences are defined as interests and preferences that according to most people are more prevalent among women. Fashion is a typical example. As one may deduct from Table 6.2.1.1, studies in this area (while not numerous) confirm that masculine interests are more prevalent among men whereas feminine interests are more frequently found among women. This pattern characterizes school children and adults alike.

Table 6.2.1.1. Masculine (as opposed to feminine) interests and preferences.

Nature of Any Difference	Prepubertal				Postpubertal	
				Childhood		Adult
Males more				**NORTH AMERICA** *United States*: DG Brown 1957; Sutton-Smith et al. 1963 (leisure activities); Kohlberg 1966:118 (play activities)		**NORTH AMERICA** *Canada*: Barrows & Zuckerman 1960 (college)
No signif. difference						
Females more						

6.2.1.2. Desire for "Heroic" (Desperate) Measures to Save One's Own Life

How heroic would you want physicians or other caregivers to be in attempting to maintain your life? In other words, if your life could only be maintained in an extremely disabled or even in a vegetative state on artificial life support, would you want to continue living? Given the availability of increasingly sophisticated means of artificial life support, this has become a growing issue in hospitals and other medical care facilities. All studies that have investigated this question have concluded that males desire more extreme and desperate measures be taken to maintain their lives than do females (Table 6.2.1.2).

Table 6.2.1.2. Desire for "heroic" (desperate) measures to save one's own life.

Nature of Any Difference					Postpubertal	
						Adult
Males want more						**MIDDLE EAST** *Israel*: Carmel 2001 (elderly) **NORTH AMERICA** *United States*: Gunasekera et al. 1986 (elderly, heart disease patients); Frankl et al. 1989; Griffith et al. 1995; Seale & Addington-Hall 1995 (even when terminally ill)
No signif. difference						
Females want more						

6.2.1.3. Desire to Live

Studies have compared males and females regarding their desire to continue living. Among both adolescents and the elderly, males expressed a stronger desire to do so than did females (Table 6.2.1.3).

Table 6.2.1.3. Desire to live.

Nature of Any Difference					Postpubertal	
					Adolescent	Adult
Males prefer more					**NORTH AMERICA** *United States*: Cavan 1932 (less males wish they had not been born)	**MIDDLE EAST** *Israel*: Carmel 2001:953 (elderly)
No signif. difference						
Females prefer more						

6.2.1.4. Desire to Quit Smoking

Studies have reached inconsistent conclusions regarding any gender difference in the desire to quit smoking among smokers (Table 6.2.1.4).

6.2.1.4. Desire to quit smoking.

Nature of Any Difference	Postpubertal	
	Adolescent	Adult
Males desire more	**EUROPE** *Norway*: Klomsten et al. 2005* (appearance strength)	**NORTH AMERICA** *United States*: Szekely et al. 1989 (college); Ward et al. 1997; Joiner et al. 2000 (among persons with bulimic symptoms); Spillane et al. 2004:91 (college)
No signif. difference		
Females desire more	**EUROPE** *Norway*: Klomsten et al. 2005* (femininity)	

6.2.1.5. Desire for Perfection in Body Appearance

A few studies among young adults have concluded that males have a stronger desire to achieve what they consider a perfect physique than is the case for females (Table 6.2.1.5).

Table 6.2.1.5. Desire for perfection in body appearance.

Nature of Any Difference	Postpubertal	
	Adolescent	Adult
Males prefer more	**EUROPE** *Norway*: Klomsten et al. 2005* (strength)	**NORTH AMERICA** *United States:* Szekely et al. 1989 (college); Joiner et al. 2000 (persons with bulimic symptoms); Spillane et al. 2004:91 (college)
No signif. difference		
Females prefer more	**EUROPE** *Norway*: Klomsten et al. 2005* (femininity, slender appearance, good looking face)	

6.2.1.6. Desire for Social Approval

According to two studies, females are more inclined than males to desire social approval (Table 6.2.1.6).

Table 6.2.1.6. Desire for social approval.

Nature of Any Difference	Prepubertal	
	Toddler	Childhood
Males more		
No signif. diff.		
Females more	**NORTH AMERICA** *United States*: M Lewis et al. 1989	**NORTH AMERICA** *United States*: Chung & Asher 1996

6.2.1.7. Interest in Dreams

One study found females expressed having greater interests in dreams than was the case for males (Table 6.2.1.7).

Table 6.2.1.7. Interest in dreams.

Nature of Any Difference	Multiple Age Categories
Males more	
No signif. diff.	
Females more	**EUROPE** *Germany*: Schredl et al. 1996

6.2.1.8. Preference for Having Children

According to one study of adults who had not yet had any children, there was no significant gender difference in the desire to do so at some point in their lives (Table 6.2.1.8.)

Table 6.2.1.8. Preference for having children.

Nature of Any Difference	Multiple Age Categories
Males more	
No signif. diff.	**NORTH AMERICA** *Canada*: van Anders 2004 (graduate students)
Females more	

6.2.1.9. Preference for Tasks Involving Skill (Versus Chance)

A number of studies have concluded that males are more likely than females to prefer tasks and games that involve greater amounts of skill (relative to mere chance) in affecting outcome (Table 6.2.1.9).

Table 6.2.1.9. Preference for tasks involving skill (versus chance).

Nature of Any Difference	Postpubertal	
	Adolescent	Adult
Males more	**NORTH AMERICA** *United States*: K Deaux et al. 1975	**NORTH AMERICA** *United States*: NT Feather 1969; GA Hudgens & Fatkin 1984; IP Levin et al. 1987; Y Chantal & Vallerond 1996 (gamblers)
No signif. diff.		
Females more		

6.2.2. Academic/Intellectual Preferences/Interests

Gender differences in people's academic or intellectual preferences and interests are summarized below.

6.2.2.1. Liking School in General

Numerous studies have concluded that females express a stronger liking for school than is the case for males (Table 6.2.2.1).

Table 6.2.2.1. Liking school in general.

Nature of Any Difference	Prepubertal	Postpubertal
	Childhood	Adolescent
Males more		
No signif. difference		
Females more	**EUROPE** *Austria*: Schober et al. 2004 (scholastic enthusiasm, gifted); *Britain*: Tenebaum 1944; Sharples 1969; Berk et al. 1970*; Rich & Darom 1981; Francis 1992; *Netherlands*: Verkuyten & Thijs 2002:217 **NORTH AMERICA** *Canada*: Isherwood et al. 1979; Lupart et al. 2004:30 (school work); *United States*: Berk et al. 1970*; Haladyna & Thomas 1979; Croucher & Reid 1981; Gnagey 1981; Okun et al. 1990	**EUROPE** *Britain*: Barker 1972; PG Richmond 1985; Darom & Rich 1988; *Spain*: Suris & Parera 2005:486 **NORTH AMERICA** *United States*: Lueptow 1975 (high school); J Epstein 1981 **OCEANIA** *New Zealand*: Fitt 1956

6.2.2.2. Wanting to Do Well in School

One study concluded that females have a greater desire to do well in school than is the case of males (Table 6.2.2.2).

Table 6.2.2.2. Wanting to do well in school.

Nature of Any Difference	Postpubertal
	Adolescent
Males more	
No signif. difference	
Females more	**OCEANIA** *Australia*: AJ Martin 2003

6.2.2.3. Attitudes Toward Homework

One study, cited in Table 6.2.2.3, indicates that females have more positive attitudes toward homework than do males.

Table 6.2.2.3. Attitudes toward homework.

Nature of Any Difference	Prepubertal
	Childhood
Males more postitive	
No signif. difference	
Females more posititve	**EUROPE** *Sweden*: Gadin & Hammarstrom 2000

6.2.2.4. Interest in/Preference for Mathematics

Among adolescents and college-aged adults, males have been found to have a stronger preference for mathematics than do their female counterparts (Table 6.2.2.4).

Table 6.2.2.4. Interests in/preference for mathematics.

Nature of Any Difference	Prepubertal				Postpubertal	
				Childhood	Adolescent	Adult
More positive among males				**EUROPE** *Germany*: Baumert et al 1997; Klieme et al. 2001; Rustemeyer & Fischer 2005	**ASIA** *Japan*: EM Evans et al. 2002*; *Taiwan*: EM Evans et al. 2002* **EUROPE** *Britain*: Duckworth & Entulstle 1974*; Keys et al. 1977; Isaacson & Freeman 1980; *Germany*: O Koller et al. 2000; *Netherlands*: Alting & Pelgrum 1990; Volman et al. 1995 **MIDDLE EAST** *Israel*: Tamir 1988 **NORTH AMERICA** *United States*: Burks et al. 1930 (gifted, age 7-20); Flanagan & Cooley 1966; Aiken 1976; JA Sherman 1980; Tobin & Fox 1980; Shaughnessy et al. 1983; Steinkamp et al. 1985 (young); EM Evans et al. 2002* **OCEANIA** *Australia*: J Jones & Young 1995 **INTERNATIONAL** *Multiple Countries*: Harnisch et al. 1986 (several Western countries)	**NORTH AMERICA** *United States*: Poffenberger & Norton 1963 (college); Ethington & Wolfe 1986
No signif. difference				**EUROPE** *Germany*: Tiedemann & Faber 1995 **NORTH AMERICA** *United States*: Terman et al. 1925		
More positive among females				**EUROPE** *Britain*: Duckworth & Entulstle 1974*		

6.2.2.5. Interest in/Preference for Science in General

Research pertaining to gender differences in preferences for studying science has been confined to adolescents. As shown in Table 6.2.2.5, the evidence has consistently indicated that males are more interested in science than are females, particularly in the case of the physical sciences such as physics, astronomy, geology, and chemistry.

Table 6.2.2.5. Interest in/preference for science in general.

Nature of Any Difference	Prepubertal				Postpubertal	
				Childhood	Adolescent	
Greater for males				**NORTH AMERICA** *United States*: Terman et al. 1925	**ASIA** *Taiwan*: EM Evans et al. 2002*; *Japan*: EM Evans et al. 2002* **EUROPE** *Britain*: A Colley et al. 1994 (age 11-13); Breakwell & Robertson 2001 **NORTH AMERICA** *Canada*: Lupart et al. 2004:33*; *United States*: B.L. Johnson 1932* (boys read more about science and sports); EM Evans et al. 2002*	
No signif. difference					**EUROPE** *Greece*: Salta & Tzougraki 2004 (chemistry)	
Greater for females						

6.2.2.6. Interest in Physical Science and Technology

Numerous studies cited in Table 6.2.2.6 indicate that males have more of an interest in physical science and technology than do females.

Table 6.2.2.6. Interest in physical science and technology.

Nature of Any Difference	Prepubertal				Postpubertal		Multiple Age Categories
				Childhood	Adolescent	Adult	
Males more				**EUROPE** *Britain*: Harvey & Edwards 1980; Ormerod & Wood 1983; Smail & Kelly 1984a; Kelly & Smail 1986	**EUROPE** *Britain*: S Johnson & Murphy 1986; Archenhold et al. 1987; Johnson & Bell 1987 **NORTH AMERICA** *United States*: Carter & Strong 1933; Terman & Miles 1936:447; Kuder 1946; Boser et al. 1998 **OCEANIA** *Australia*: Burfitt 1989 (science); J Jones & Young 1995 (science & math)	**NORTH AMERICA** *United States*: Traxler & McCall 1941 (college)	**EUROPE** *Germany*: Warczok 1988:183 **NORTH AMERICA** *United States*: Lehman & Witty 1931
No signif. difference							
Females more							

6.2.2.7. Interest in Biological and Health Science

Table 6.2.2.7 indicates that females have more of an interest in biology and health science than do males.

Table 6.2.2.7. Interest in biological and health science.

Nature of Any Difference	Prepubertal	Postpubertal
	Childhood	Adolescent
Males more		
No signif. difference		
Females more	**EUROPE** *Britain*: Harvey & Edwards 1980; Ormerod & Wood 1983; Smail & Kelly 1984a; Kelly & Smail 1986	**EUROPE** *Britain*: S Johnson & Murphy 1986; Archenhold et al. 1987

6.2.2.8. Interest in/Preference for History

In one study, males were found to express greater interest than females in the study of history (Table 6.2.2.8).

Table 6.2.2.8. Interest in/preference for history.

Nature of Any Difference	Prepubertal
	Childhood
Males more	**NORTH AMERICA** *United States*: Terman et al. 1925 (US history)
No signif. difference	
Females more	

6.2.2.9. Interest in Art and the Humanities

A couple of studies revealed that females were more interested in art and the humanities as subjects of study than was the case for males (Table 6.2.2.9).

Table 6.2.2.9. Interest in art and the humanities.

Nature of Any Difference	Postpubertal
	Adolescent
Males more	
No signif. difference	
Females more	**NORTH AMERICA** *United States*: JH Coleman 1931; A Colley et al. 1994 (age 11-13)

6.2.2.10. Interest in English or Literary/Language Related Subjects

The available research on sex differences in interest in English or other language-related subject areas is not entirely consistent, but suggests that females have greater interest than do males (Table 6.2.2.10).

Table 6.2.2.10. Interest in English or literary/language related subjects.

Nature of Any Difference	Postpubertal
	Adolescent
Males more	
No signif. difference	**NORTH AMERICA** *United States*: Terman et al. 1925
Females more	**NORTH AMERICA** *United States*: JH Coleman 1931; A Colley et al. 1994 (age 11-13)

6.2.2.11. Interest in/Preference for Academic Subjects Dealing With the Family

One study indicated that academic courses pertaining to the family were more interesting to girls than to boys (Table 6.2.2.11).

Table 6.2.2.11. Interest in/preferences for academic subjects dealing with the family.

Nature of Any Difference	Postpubertal
	Adolescent
Males more positive	
No signif. difference	
Females more positive	**ASIA** *Russia*: Cherkassova 1992 (family life)

6.2.2.12. Interest in Causation

According to one study, males asked more questions in class about why things were as they were – implying that they had greater interest in topics having to do with causation – than was the case for females (Table 6.2.2.12).

Table 6.2.2.12. Interest in causation.

Nature of Any Difference	Sub-Adolescent
	Childhood
Males more	**NORTH AMERICA** *United States*: EA Davis 1932 (asks causal questions); HC Davis 1932
No signif. difference	
Females more	

6.2.2.13. Aspired/Desired Years of Education

Several social scientists have investigated sex differences in educational aspirations. They have revealed that on average males want to obtain more years of education than do females (Table 6.2.2.13).

Table 6.2.2.13. Aspired/desired years of education.

Nature of Any Difference	Postpubertal
	Adolescent
Males more	**NORTH AMERICA** *United States*: Ezell & Tate 1955; RM Stephenson 1957; DJ Bordua 1960; JS Coleman 1961; JC Flanagan et al. 1964; WH Sewell 1964; RH Turner 1964; Douvan & Adelson 1966:40 (plan to go to college); C Gordon 1969; F Harrison 1969; Marini & Greenberger 1978; Fiorentine 1988:153* (during the year 1969)
No signif. difference	**NORTH AMERICA** *United States*: Fiorentine 1988:153* (during the year 1984)
Females more	

6.2.2.14. Relationship Between Educational Aspirations and Parental Status

According to several studies, a stronger positive correlation has been found between educational aspirations and parental social status among females than among males (Table 6.2.2.14).

Table 6.2.2.14. Relationship between educational aspirations and parental status.

Nature of Any Difference	Postpubertal	
	Adolescent	Adult
Males more		
No signif. difference		
Females more	**NORTH AMERICA** *United States*: Ezell & Tate 1955; Sewell & Shah 1967; Sewell & Shah 1968a; Sewell & Shah 1968b; AE Bayer 1969; Marini 1974	**NORTH AMERICA** *United States*: KL Alexander & Eckland 1974 (college)

6.2.3. Preferences/Desires Surrounding Social Interactions and Social Interests

Sex differences in desires to communicate with others have been investigated with regard to a number of different topics as revealed through the following tables.

6.2.3.1. Basic Social Preferences and Interests in General

Even in infancy, studies have revealed that females exhibit a stronger interest in their overall social surroundings than do males (Table 6.2.2.1).

Table 6.2.3.1. Basic social preferences and interests in general.

Nature of Any Difference	Prepubertal		Postpubertal	Multiple Age Categories
	Infant	Childhood	Adolescent	
Males more				
No signif. difference				
Females more	**NORTH AMERICA** *United States*: Malatesta & Haviland 1982; Weinberg et al. 1994 (6 month olds)	**NORTH AMERICA** *United States*: HC Davis 1932; Jersild et al. 1933	**EUROPE** *Britain*: G Keir 1945 (young, attending to social surroundings)	**NORTH AMERICA** *United States*: EA Davis 1932 (social relationships)

6.2.3.2. Preference for Being Popular and Liked by Others

According to Table 6.2.3.2, several studies have found that females express a greater desire for popularity and acceptance from others than do males.

Table 6.2.3.2. Preference for being popular and liked by others.

Nature of Any Difference	Prepubertal	Postpubertal
	Childhood	Adolescent
Males more		
No signif. difference		
Females more	**NORTH AMERICA** *United States*: KM Lagerspett et al. 1988*	**ASIA** *China*: Lau & Leung 1992 (need for affiliation) **NORTH AMERICA** *United States*: JS Coleman 1961; M Rosenberg 1965:254; Douvan & Adelson 1966; WL Wallace 1966; Rosenberg & Simmons 1975; Simmons & Rosenberg 1975; TJ Berndt 1982 (young); KM Lagerspett et al. 1988* (young)

6.2.3.3. Preference for Social Activities With Rules

According to Table 6.2.3.3, males are more likely than females to prefer social activities in which there are specific rules describing boundaries and limits within which those activities are conducted.

Table 6.2.3.3. Preference for social activities with rules.

Nature of Any Difference	Prepubertal	
	Early Childhood	Childhood
Males more	**EUROPE** *Switzerland*: Piaget 1932* (more insistent on rule-following)	**EUROPE** *Switzerland*: Piaget 1932:83* **NORTH AMERICA** *United States*: Lever 1976; Lever 1978 (play more complex games in terms of rules)
No signif. difference		
Females more		

6.2.3.4. Preference for Breaking Rules in Organized Social Activities

According to Table 6.2.3.4, males have a greater preference for breaking (or at least bending) rules than do females when they are engaged in social activities, most notably games.

Table 6.2.3.4. Preference for breaking rules in organized social activities.

Nature of Any Difference	Postpubertal	
	Adolescent	Adult
Males more	**NORTH AMERICA** *United States*: Novacek et al. 1991	**NORTH AMERICA** *United States*: H Klein 1992; Tibbetts & Herz 1996
No signif. difference		
Females more		

6.2.3.5. Preference for Task-Oriented Social Networks/Activities

According to one study, relative to females, males prefer social activities that are focused toward achieving or completing a specific task, rather than social activities that are less task-oriented (Table 6.2.3.5).

Table 6.2.3.5. Preference for task-oriented social networks/activities.

Nature of Any Difference	Postpubertal
	Adolescent
Males more	**NORTH AMERICA** *United States*: Karweit & Hansell 1983
No signif. difference	
Females more	

6.2.3.6. Preference for Socializing With One's Own Age Group

One study indicated that males had a stronger preference than did females for socially interacting with peers as opposed to persons considerably older or younger than themselves (Table 6.2.3.6).

Table 6.2.3.6. Preference for socializing with one's own age group.

Nature of Any Difference	Prepubertal
	Childhood
Males more	**ASIA** *Soviet Union*: Bronfenbrenner 1970 (school age boys more peer oriented)
No signif. difference	
Females more	

6.2.3.7. Preferring to Socialize With One's Own (Rather than the Opposite) Sex

A few studies have investigated preferences for socializing with one's own as opposed to the opposite sex. As shown in Table 6.2.3.7, these studies have reached different conclusions, with the possibility of age being a qualifying factor.

Table 6.2.3.7. Preferring to socialize with one's own (rather than the opposite) sex.

Nature of Any Difference	Prepubertal			Postpubertal
	Toddler	Early Childhood	Childhood	Adult
Males more	**NORTH AMERICA** *United States*: Jacklin & Maccoby 1978	**NORTH AMERICA** *United States*: HD Fishbein & Imai 1993*		
No signif. difference				
Females more			**NORTH AMERICA** *United States*: Hartup 1983; Thorne 1986; Maccoby & Jacklin 1987; Maccoby 1988; Fishbein & Imai 1993* (preschool); Powlishta et al. 1994	**NORTH AMERICA** *United States*: MA Caldwell & Peplau 1982 (college-intimate same-sex relationships); S Rose 1985; Worell 1988 (college)

6.2.3.8. Desire/Preference for Interpersonal Harmony and Cooperation

Studies cited in Table 6.2.3.8 have indicated that throughout a wide age spectrum, females prefer to maintain interpersonal harmony and cooperation more than males in their social interactions.

Table 6.2.3.8. Desire for interpersonal harmony and cooperation.

Nature of Any Difference	Prepubertal	Postpubertal		Multiple Age Categories
	Childhood	Adolescent	Adult	
Males more				
No signif. difference				
Females more	**NORTH AMERICA** *United States*: Capage & Lindskold 1973 (experimental game)	**NORTH AMERICA** *United States*: Lindskold & Horai 1974 (in an experimental game)	**NORTH AMERICA** *United States*: Tedeschi et al. 1970 (college, in an experimental game); A Kahn et al. 1980 (college)	**EUROPE** *Spain*: Martinez-Tur et al. 2001

6.2.3.9. Interest in Compromising/Willingness to Compromise

A couple of studies have indicated that females are more willing to compromise than are males (Table 6.2.3.9).

Table 6.2.3.9. Interests in compromising/willingness to compromise.

Nature of Any Difference	Postpubertal
	Adult
Males more	
No signif. difference	
Females more	**NORTH AMERICA** *United States*: Kilmann & Thomas 1977; Beryman-Fink & Brunner 1987

6.2.3.10. Desire to Form Strong Interpersonal Relationships

Numerous studies have concluded that females have a stronger preference than males did for forming strong interpersonal relationships with others (Table 6.2.3.10).

Table 6.2.3.10. Desire to form strong interpersonal relationships.

Nature of Any Difference	Postpubertal	
	Adolescent	Adult
Males more		
No signif. difference		
Females more	**ASIA** *China*: Yuan & Shen 1998	**EUROPE** *England*: Veilel 1996 (interpersonal dependence on others) **NORTH AMERICA** *United States*: Roloff & Greenberg 1979; McAdams & Constantian 1983; A Christensen 1988 (married couples, maintain close social relationships); FA Russ & McNeilly 1995 (company employees); HA Turner & Turner 1999 (interpersonal dependance on others); Sanathara et al. 2003:929 (interpersonal dependence on others); Schultheiss & Brunstein 2001 (desire social affiliation) **INTERNATIONAL** *Multiple countries*: Morinaga et al. 1993 (being socially connected)

6.2.3.11. Preference for/Acceptance of Aggressive Responses to Problems

According to numerous studies, relative to females, males of various ages express preferences for resorting to aggressive (confrontational) responses to problems with others (Table 6.2.3.11).

Table 6.2.3.11. Preference for/acceptance of aggressive responses to problems.

Nature of Any Difference	Prepubertal		Postpubertal	Multiple Age Categories
	Early Childhood	Childhood	Adult	
Males more prefer/accept	**OCEANIA** *Australia*: S Walker et al. 2002	**EUROPE** *Britain*: J Archer & Parker 1994; K Tapper & Boulton 2000 **NORTH AMERICA** *United States*: Deluty 1983 (school age); PM Miller et al. 1986 (school age); Bredemeier et al. 1987 (in sports); MK Underwood et al. 1999 (school age)	**EUROPE** *Britain*: A Campbell & Muncer 1987; A Campbell et al. 1992; A Campbell et al. 1993; A Campbell & Munces 1994; A Campbell et al. 1995; J Archer & Haigh 1996; A Campbell et al. 1997; Ireland & Archer 2002 (among prisoners) **NORTH AMERICA** *United States*: Silva 1983 (college, in sports); T Smith 1984; Herzberger & Tennen 1985; Finn 1986 (college, in marriage); Howe et al. 1988 (among child abuse counselors); Blier & Blier-Wilson 1989; RJ Harris & Cook 1994 (college); Tucker & Parks 2001 (college, in sports)	**NORTH AMERICA** *United States*: Bredemeier 1985 (in sports)
No signif. difference				
Females more prefer/accept				

6.2.3.12. Preference for Fighting

Two studies have found that males expressed a greater preference for becoming involved in fights than did females (Table 6.2.3.12).

Table 6.2.3.12. Preference for fighting.

Nature of Any Difference	Prepubertal	Postpubertal
	Childhood	Adult
Males more	**NORTH AMERICA** *United States*: Hurlock 1927 (self-rated)	**NORTH AMERICA** *United States*: Borofsky et al. 1971 (more likely to intervene in street fights involving strangers during staged fight)
No signif. difference		
Females more		

6.2.3.13. Interest in Competing/Preference for Competitive Social Activities

In a wide variety of social settings, males have been found to prefer to engage in competitive social activities more than do females (Table 6.2.3.13). Nevertheless, if males sense that they are going to fail at a particular competitive activity, they seem to be more prone than females to withdraw from attempting the activity (Warrington et al. 2000:396).

Table 6.2.3.13. Interests in competing/preference for competitive social activities.

Nature of Any Difference	Prepubertal		Postpubertal	Multiple Age Categories
	Early Childhood	Childhood	Adolescent	
Males more	**NORTH AMERICA** *United States*: Sachs 1987; A Sheldon 1990; A Sheldon 1992	**NORTH AMERICA** *United States*: Smoll & Schutz 1980 (sports); DN Maltz and Borker 1983; CC Weisfeld et al. 1983:704 (spelling bee); GP Knight & Chao 1989 (young); MH Goodwin 1990	**EUROPE** *Britain*: Head 1996 (in an academic setting); Boaler 1997 (in mathematics) **NORTH AMERICA** *United States*: Kilmann & Thomas 1977; L Owens & Barnes 1982* (in math class); Berryman-Fink & Brunner 1987; Beutel & Marini 1995 (for material wealth)	**ASIA** *Japan*: Lynn et al. 1991*; Yamauchi et al. 1994:197* **EUROPE** *Britain*: Lynn et al. 1991*; *Ireland*: Yamauchi et al. 1994:197*
No signif. difference				
Females more			**NORTH AMERICA** *United States*: L Owens & Barnes 1982* (in English class)	

6.2.3.14. Interest in (Preference for Interactions With) Infants and Young Children

A large number of studies have examined gender differences in interests in infants and young children by adolescents and adults (and occasionally by older children). While most of these studies have pertained to humans, other primate species have also been investigated (inferred on the basis of efforts made to remain proximate to infants).

In the majority of studies of subadolescents, females express or exhibit a greater interest in infants that did subadolescent males. This generalization seems to hold true as much for non-human porimates as for humans (Split-Table 6.2.3.14a).

Split-Table 6.2.3.14a. Interest in (preference for interactions with) infants and young children (prepubertal).

Nature of Any Difference	Prepubertal		
	Toddler	Early Childhood	Childhood
Males more			**PRIMATE (EXCEPT APE)** *Barbary Macaque*: FD Burton 1972 (field)
No signif. difference			**NORTH AMERICA** *United States*: SS Feldman et al. 1977* (interests in photos of infants); S Goldberg et al. 1982:1548*
Females more	**NORTH AMERICA** *United States*: Dunn & Kendrick 1982 **PRIMATE (EXCEPT APE)** *Baboon*: Rowell et al. 1968; *Rhesus Macaque*: Breuggeman 1964; *Stump-tailed Macaque*: Estrada 1978	**PRIMATE (EXCEPT APE)** *Rhesus Macaque*: Lovejoy & Wallen 1988	**AFRICA** *Kenya*: CP Edwards & Whiting 1993 **NORTH AMERICA** *United States*: PW Berman et al. 1975*; PW Berman et al. 1977; PW Berman et al. 1978*; Frodi & Lamb 1978*; Melson & Fogel 1988:42; Blakemore 1990; Maestripieri & Pelka 2002* (photos) **FELINE** *Lion*: G Schaller 1972 (field) **PRIMATE (EXCEPT APE)** *Rhesus Macaque*: Chamove et al. 1967 (captivity); *Squirrel Monkeys*: JD Baldwin 1969 (captive); *Vervet Monkey*: JB Lancaster 1971 (field); MJ Raleigh et al. 1979 (captivity)

By and large, studies of adolescents and adults have also found that females express or exhibit a greater interest in infants and young children than do males both in humans and in other primates that have been studied (Split-Table 6.2.3.14b).

Split-Table 6.2.3.14b. Interest in (preference for interactions with) infants and young children (postpubertal).

Nature of Any Difference	Postpubertal		Multiple Age Categories
	Adolescent	Adult	
Males more		**PRIMATE (EXCEPT APE)** *Long-Tailed Macaque*: JC Fady 1969	
No signif. difference	**NORTH AMERICA** *United States*: SS Feldman et al. 1977* (young)	**NORTH AMERICA** *United States*: SS Feldman et al. 1977* (college) **PRIMATE (EXCEPT APE)** *Talapoin Monkey*: J Wolfheim 1978 (captivity)	
Females more	**NORTH AMERICA** *United States*: PW Berman et al. 1975*; Fullard & Reiling 1976 (photos of infants); SS Feldman et al. 1977* (older); PW Berman et al. 1978*; SS Feldman & Nash 1979a; S Goldberg et al. 1982:1548*; Maestripieri & Pelka 2002* (photos) **APE** *Chimpanzee*: Mellen 1981:35; *Gorilla*: Meder 1990 (captivity) **PRIMATE (EXCEPT APE)** *Baboons*: Bolwig 1959; Jay 1965; Seyfarth 1976 (other than one's own infants); DL Cheney 1978 (other than one's own infants); *Barbary Apes*: FD Burton 1972; *Pigtail Macaques*: Zehr 1998; *Rhesus Macaque*: Hinde et al. 1964 (not own infants); Spencer-Booth 1968* (not own infants); Herman et al. 2003	**EUROPE** *Sweden*: Frodi et al. 1982 (young) **NORTH AMERICA** *United States*: Beier et al. 1957 (young); E Hess & Polt 1960 (college); Fullard & Reiling 1976* (young); Lamb 1976 (young); SS Feldman et al. 1977*; Lamb 1977 (young); Clarke-Stewart 1978 (young); Hildebrandt & Fitzgerald 1978 (young); SS Feldman & Nash 1978* (college); Frodi & Lamb 1978* (young); SS Feldman & Nash 1979b; Berman 1980; Nash & Feldman 1980; Blakemore 1981 (young); Nash & Feldman 1981 (young); Yogman 1982 (young); Belsky et al. 1984 (young); Blakemore 1985 (young); Blakemore 1991b	**NORTH AMERICA** *United States*: Fullard & Reiling 1976*; SS Feldman et al. 1977*; SS Feldman & Nash 1978; Maestripieri & Pelka 2002:33* (from childhood through elderly) **PRIMATE (EXCEPT APE)** *Langurs*: Jay 1963; *Rhesus Macaque*: Spencer-Booth 1968*

6.2.3.15. Interest in Family Affairs

A limited number of studies have indicated that females have a greater interest in family affairs than do males (Table 6.2.3.15).

Table 6.2.3.15. Interest in family affairs.

Nature of Any Difference	Prepubertal	
	Early Childhood	Childhood
Males more		
No signif. difference		
Females more	**NORTH AMERICA** *United States*: M Libby & Aries 1989 (in fantasy stories told)	**NORTH AMERICA** *United States*: Nicoloupou et al. 1992 (stories told); Eisenberg et al. 1994 (in stories told)

6.2.3.16. Greater Interest in Persons Than in Things

Studies of the degree to which subjects have an interest in people rather than in things (either in the form of inanimate objects or living things other than humans) indicate that females are more people-oriented than is true for males (Table 6.2.3.16).

Table 6.2.3.16. Greater interest in persons than in things.

Nature of Any Difference	Prepubertal		Multiple Age Categories
	Toddler	Early Childhood	
Males more			
No signif. difference			
Females more	**NORTH AMERICA** *United States*: M Lewis 1969	**NORTH AMERICA** *United States*: Goodenough 1957	**EUROPE** *Germany*: EL Thorndike 1914:201 **NORTH AMERICA** *United States*: EM Bennett & Cohen 1959

6.2.3.17. Interest in Protecting (Providing Care to) Others (Except to Infants and Young Children)

The findings from studies undertaken to assess sex differences in people's interests in protecting or providing care to others (except for infants and young children) have not been entirely consistent (Table 6.2.3.17.)

Table 6.2.3.17. Interest in protecting (providing care to) others (except to infants and young children).

Nature of Any Difference	Prepubertal				Postpubertal		
				Childhood		Adults	
Males more						**NORTH AMERICA** *United States:* Bryan & Test 1967 (help strangers); Piliavin et al. 1969 (help strangers); Latane 1970 (help strangers); Gaertner & Bickman 1971 (help strangers); WE Simon 1971 (help strangers); Wispe & Freshly 1971 (help strangers); Graf & Riddle 1972 (help strangers);Piliavin & Piliavin 1972 (help strangers); Ehlert et al. 1973 (help strangers); GW Morgan 1973 (help strangers); Penner et al. 1973 (help strangers); Pomazal & Clore 1973 (help strangers)	
No signif. difference							
Females more				**NORTH AMERICA** *United States*: M Libby & Aries 1989		**NORTH AMERICA** *United States*: McGovern & Hawks 1986 (helping others, college, psychology majors) **INTERNATIONAL** *Multiple Countries*: Morinaga et al. 1993 (helping others in general)	

6.2.3.18. Preference for Intimate (Non-Sexual) Same-Sex Relationships

Several studies have sought to determine if a gender difference exists with regard to desiring intimate same-sex relationships that are not of a sexual nature. Most studies indicate that this preference is stronger for females than for males (Table 6.2.3.18).

Table 6.2.3.18. Preference for intimate (non-sexual) same-sex relationships.

Nature of Any Difference	Prepubertal				Postpubertal		Multiple Age Categories
				Childhood	Adolescent	Adult	
Males more							
No signif. difference						**NORTH AMERICA** *United States*: Wheeler & Nezlek 1977 (college); Nezlek 1978 (college)	
Females more				**NORTH AMERICA** *United States*: Thorne 1986; Benenson et al. 1997 (more time in dyad same-sex interactions)	**NORTH AMERICA** *United States*: Sones & Feshbach 1971 (more rejecting of newcomers)	**NORTH AMERICA** *United States*: R Lewis 1978; Heslin & Boss 1980 (airport hugging); Wheeler et al. 1983 (college); Reis et al. 1985 (college); Reis et al. 1986 (college); Reis et al. 1993 (college); Hodgins & Zuckerman 1990 (college); Tidwell et al. 1996 (college)	**NORTH AMERICA** *United States*: Rubin 1985 (female same-sex friendship more intimate)

6.2.3.19. Interest in One's Rank in a Social Hierarchy

Most studies have concluded that males have a stronger interest in their status or rank in social hierarchies than do females (Table 6.2.3.19).

Table 6.2.3.19. Interest in one's rank in a social hierarchy.

Nature of Any Difference					Postpubertal		Multiple Age Categories
					Adolescent	Adult	
Males more					**NORTH AMERICA** *United States*: Rosenberg & Simmons 1975	**EUROPE** *Germany*: J Smith & Baltes 1998 **NORTH AMERICA** *United States*: Yammarino & Dubinsky 1988 (among sales persons); WA Weeks & Nantel 1995 (among sales persons)	**NORTH AMERICA** *United States*: Aries 1987:170
No signif. difference						**NORTH AMERICA** *United States*: Shore & Thorton 1986 (among blue collar workers)	
Females more							

6.2.3.20. Masculine (Versus Feminine) Interests

One study suggested that males exhibit more generally masculine than feminine interests when compared to females (Table 6.2.3.20).

Table 6.2.3.20. Masculine (versus feminine) interests.

Nature of Any Difference					Postpubertal	
					Adolescents	
Males more					**NORTH AMERICA** *United States*: Trumbull 1953	
No signif. difference						
Females more						

6.2.3.21. Preference for (Attachment to) One's Mother vs. One's Father

According to Table 6.2.3.21, most studies have found males having more of an attachment to their mothers than to their fathers than is true for females.

Table 6.2.3.21. Preference for (attachment to) one's mother vs. one's father.

Nature of Any Dif-ference	Prepubertal		Postpubertal
	Infant	Childhood	Adolescent
Males more	**NORTH AMERICA** *United States*: Bowlby 1973; Waters 1978	**NORTH AMERICA** *United States*: Simpson 1935; Meltzer 1936*	**NORTH AMERICA** *United States*: Meltzer 1936*; Meltzer 1943 (young); Steinberg & Silverberg 1986 (perceived closeness); Silverberg & Steinberg 1987 (perceived closeness); Burrow et al. 2004:277 (adoptees, perceived closeness)
No signif. difference		**NORTH AMERICA** *United States*: Mott 1937	**NORTH AMERICA** *United States*: Hayward 1935 (young)
Females more			

6.2.3.22. Preference for (Attachment to) One's Father vs. One's Mother

Table 6.2.3.22 suggests that neither females nor males have more of an attachment to their fathers than to their mothers or that there is no significant difference in this regard.

Table 6.2.3.22. Preference for (attachment to) one's father vs. one's mother.

Nature of Any Difference	Prepubertal	Postpubertal
	Childhood	Adolescent
Males more		
No signif. difference		**NORTH AMERICA** *United States*: Burrow et al. 2004:277 (adoptees, perceived closeness)
Females more	**NORTH AMERICA** *United States*: Meltzer 1936*	**NORTH AMERICA** *United States*: Meltzer 1936*

6.2.3.23. Preference for (Pride in/Identification With) One's Own Race/Ethnicity

Table 6.2.3.23 presents a summary of gender differences in pride and identification with one's own ethnicity. No consistent gender difference is apparent.

Table 6.2.3.23. Preference for (pride in/identification with) one's own race/ethnicity.

Nature of Any Dif-ference	Postpubertal	
	Adolescent	Adult
Males more		**NORTH AMERICA** *Canada*: Fathi 1972 (young, Jews); *United States*: Ting-Toomey 1981 (young, Chinese-Americans)
No signif. difference		
Females more	**NORTH AMERICA** *United States*: Plummer 1995 (Blacks); Rotheram-Borus et al. 1998; Ullah 1985 (2nd generation Irish)	**NORTH AMERICA** *United States*: Fine & Bowers 1984 (young)

6.2.3.24. Personal Space Preferences or Preferences for Interpersonal Distance

Personal space is the distance deemed comfortable by people during interpersonal interactions. As seen in Table 6.2.3.24, in most of the studies males expressed desires for more personal space than females.

Table 6.2.3.24. Personal space preferences or preferences for interpersonal distance.

Nature of Any Dif-ference	Prepubertal	Postpubertal	
	Childhood	Adolescent	Adult
Males want more		**NORTH AMERICA** *United States*: Tennis & Dabbs 1975:391*	**NORTH AMERICA** *United States*: Willis 1966 (young); Guardo 1969 (young); Lett et al. 1969:18 (young); Tennis & Dabbs 1975:392*
No signif. difference	**NORTH AMERICA** *United States*: Tennis & Dabbs 1975:391*		**NORTH AMERICA** *United States*: EA Bauer 1973 (college)
Females want more			

6.2.3.25. Preference for Friendly/Accommodating Social Interactions

Females appear to prefer friendly and accommodating social interactions (as opposed to confrontational interactions) to a greater degree than males (Table 6.2.3.25).

Table 6.2.3.25. Preferences for friendly/accommodating social interactions.

Nature of Any Dif-ference	Prepubertal		Postpubertal	
	Toddler	Childhood	Adolescent	Adult
Males more				
No signif. difference				
Females more	**PRIMATE (EXCEPT APE)** *Macaque*: H Harlow 1962	**EUROPE** *Germany*: Cohn & Dieffenbacher 1911* **NORTH AMERICA** *United States*: Tryon 1935*	**EUROPE** *Germany*: Cohn & Dieffenbacher 1911* **MIDDLE EAST** *Israel*: Margalit & Eysenck 1990 **NORTH AMERICA** *United States*: Tryon 1935*; Carter & Strong 1933	**EUROPE** *Germany*: Cohn & Dieffenbacher 1911* (young) **NORTH AMERICA** *Canada*: Y Lunsky 2003; *United States*: Stoke & West 1931 (young); Julian et al. 1968 (young)

6.2.3.26. Role Model Preference

According to research on role model preferences, when both males and females are asked to name someone they strongly admire or would like to emulate, male role models are more often named. However, as shown in Table 6.2.3.26, this bias toward male role models appears to be stronger for males than for females.

Table 6.2.3.26. Role model preference.

Nature of Any Difference	Postpubertal
	Adult
Males choose males more	**NORTH AMERICA** *United States*: Basow & Howe 1980 (college); Wohlford et al. 2004 (college)
No signif. difference	
Females choose males more	

6.2.3.27. Tolerance for Others Who Are Unusually Withdrawn

One multinational study found that females have more tolerance of people who are unusually shy and withdrawn than do males (Table 6.2.3.27).

Table 6.2.3.27. Tolerance for others who are unusually withdrawn.

Nature of Any Dif-ference	Postpubertal
	Adolescent
Males more	
No signif. difference	
Females more	**INTERNATIONAL** *Multiple Countries*: DS Crystal et al. 1997:160 (US, Japan, China)

6.2.3.28. Tolerance for Others Who Are Unusually Aggressive and Cruel

The same study cited directly above also reported that males are more prone than females to tolerate people who are unusually aggressive or cruel (Table 6.2.3.28).

Table 6.2.3.28. Tolerance for others who are unusually aggressive and cruel.

Nature of Any Dif-ference	Postpubertal
	Adolescent
Males more	**INTERNATIONAL** *Multiple Countries*: DS Crystal et al. 1997:160 (US, Japan, China)
No signif. difference	
Females more	

6.2.3.29. Tolerance for Others Who Are Unfortunate and Disagreeable

So far, one study has examined gender differences in willingness to deal with people who are down on their luck or are generally unpleasant people. It found that this willingness was greater among females than among males (Table 6.2.3.29).

Table 6.2.3.29. Tolerance for others who are unfortunate and disagreeable.

Nature of Any Difference	Multiple Age Categories
Males more	
No signif. difference	
Females more	**NORTH AMERICA** *United States*: EK Strong 1943

6.2.3.30. "High Brow" Preference (Aesthetic/Cultural Preferences)

According to one study, females prefer "high brow" tastes in aesthetics and culture more than do males (Table 6.2.3.30).

Table 6.2.3.30. "High brow" preference (aesthetic/cultural preferences).

Nature of Any Difference	Multiple Age Categories
Males more	
No signif. difference	
Females more	**EUROPE** *Sweden*: Bihagen 1999:146

6.2.3.31. Preference/Desires for Pleasing Others

Three studies found that females express stronger desires for pleasing teachers than do males (Table 6.2.3.31).

Table 6.2.3.31. Preference/desires for pleasing others.

Nature of Any Difference	Postpubertal
	Adolescent
Males more	
No signif. difference	
Females more	**NORTH AMERICA** *United States*: ET Higgins 1991 (pleasing parents and teachers); Pomerantz & Ruble 1998 (pleasing parents and teachers); TK DeBacker & Nelson 2000 (pleasing teachers)

6.2.3.32. Desire for Control

According to all of the studies found regarding which sex has a greater desire to be in control of their environment, males surpass females to a significant degree (Table 6.2.3.32).

Table 6.2.3.32. Desire for control.

Nature of Any Difference	Prepubertal		Multiple Age Categories
	Toddler	Childhood	
Males more	**NORTH AMERICA** *United States*: Gunnar-von Gnechten 1978	**NORTH AMERICA** *United States*: Chung & Asher 1996 (regarding their toys)	**NORTH AMERICA** *United States*: Burger & Cooper 1979; Epel et al. 1999:12
No signif. difference			
Females more			

6.2.3.33. Interest in Politics

As indicated in Table 6.2.3.33, a large number of studies have sought to determine which gender has greater interest in politics. Nearly all of the studies indicated that from school age onward, males have a greater interest in politics than do females regarding national and international affairs. In the case of local issues, several studies have found females to express a greater interest.

Table 6.2.3.33. Interest in politics.

Nature of Any Difference	Prepubertal	Postpubertal		Multiple Age Categories
	Childhood	Adolescent	Adult	
Males more	**MIDDLE EAST** *Israel*: Spiro 1969:281 **NORTH AMERICA** *United States*: Geddie & Hildreth 1944 (international relations and conflicts); B Berelson et al. 1954; A Campbell et al. 1954; Hyman 1959* (global and national); Greenstein 1961* (national and international affairs); Greenstein 1965; RD Hess &Torney 1967*; RD Hess & Torney 1968:214; Easton & Dennis 1969; Greenstein 1969:115 **INTERNATIONAL** *Multiple Countries*: Torney et al. 1975* (global and national)	**EUROPE** *Sweden*: Heiskanen 1971* (global and national) **NORTH AMERICA** *United States*: Andrain 1971:138; Dearden 1974* (global and national)	**NORTH AMERICA** *United States*: RD Hess & Torney 1967* (young); MK Jennings & Niemi 1975; Sapiro 1983; LL Bennett & Bennett 1989; S Verba et al. 1997 (survey); Bernstein 2005 (college)	**EUROPE** *Germany*: N Schwarz et al. 1987 **NORTH AMERICA** *United States*: Almond & Verba 1963:390 (international); Verba et al. 1997
No signif. diff.			**ASIA** *India*: L Singh & Singh 1983 (college)	
Females more	**NORTH AMERICA** *United States*: Hyman 1959* (local affairs); Greenstein 1961* (local affairs) **INTERNATIONAL** *Multiple Countries*: Torney et al. 1975* (local affairs)	**EUROPE** *Sweden*: Heiskanen 1971* (local affairs) **NORTH AMERICA** *United States*: Dearden 1974* (local affairs)		

6.2.3.34. Interest in Religion

The one study that asked subjects to rate their interest in religion concluded that females provided higher ratings than did males (Table 6.2.3.34).

Table 6.2.3.34. Interest in religion.

Nature of Any Difference	Postpubertal
	Adolescent
Males more	
No signif. difference	
Females more	**NORTH AMERICA** *United States*: JH Coleman 1931

6.2.4. Sports, Games, and Exercise Interests

A substantial number of studies have sought to determine if males and females differ regarding their interests in sports, games, and exercise. Findings are summarized in the following subsection.

6.2.4.1. Interest in Sports in General

Several studies have found males exhibiting or expressing greater interest in sports than is true for females (Table 6.2.4.1).

Table 6.2.4.1. Interest in sports in general.

Nature of Any Difference		Postpubertal	
	Childhood	Adolescent	Adult
Greater in males	**NORTH AMERICA** *United States*: Terman et al. 1925 (fishing, wrestling, boxing, football, baseball, hiking, & camping)	**EUROPE** *Multiple Scandinavian Countries*: Braathen & Svebak 1992 (motivated by self-mastery wishes); *Netherlands*: Elling & Knoppers 2005:261 **NORTH AMERICA** *United States*: B.L. Johnson1932* (boys read more about science and sports)	**EUROPE** *Norway*: Klomsten et al. 2005 (high school,sports competence important) **NORTH AMERICA** *United States*: McCauley 1995:236 (enjoy team sports more than individual sports, college)
No signif. difference			
Greater in females			

6.2.4.2. Interest in Observing Sports/Sporting Activities (Spectator Sports Interest)

Table 6.2.4.2 indicates that males are more interested in observing sporting events than are females.

Table 6.2.4.2. Interest in observing sports/sporting activities (spectator sports interest)

Nature of Any Dif-ference				Postpubertal		Multiple Age Categories
				Adolescent	Adult	
Greater in males				**ASIA** *Japan*: EM Evans et al. 2002*; *Taiwan*: EM Evans et al. 2002* **NORTH AMERICA** *United States*: J Butcher 1985; DM Smith 1987; Kirshnit et al. 1989; Busser 1995 (outdoor sports); TE Smith 1997; EM Evans et al. 2002*	**NORTH AMERICA** *United States*: DW Bishop 1970; DW Bishop & Ikeda 1970; Gruber 1980:263; Gantz 1981 (televised sports) **OCEANIA** *Australia*: Leslie et al. 1999 (college, team sports)	**NORTH AMERICA** *Canada*: Pooley 1980; *United States*: Chervokas 1985 (wrestling); Gallup 1992
No signif. difference						
Greater in females						

6.2.4.3. Interest in Participating in Sporting Activities

Interests in participating in sporting activities has been shown to be greater for males than for females (Table 6.2.4.3).

Table 6.2.4.3. Interest in participating in sporting activities.

Nature of Any Dif-ference	Prepubertal			Postpubertal		Multiple Age Categories
			Childhood	Adolescent		
Greater in males			**NORTH AMERICA** *United States*: JC Foster 1930 (play activities: football & baseball); Crum 1980; Smoll & Schutz 1980; Birtwistle & Brodie 1991; MK Hicks et al. 2001	**EUROPE** *Britain*: Armstrong et al. 1990; A Colley et al. 1994 (physical education); *Germany*: Fuch et al. 1988; *Iceland*: Vilhjalmsson & Kristjansdottir 2003; *Norway*: Tell & Veller 1988 **MIDDLE EAST** *Turkey*: Koca & Demirhan 2004 **NORTH AMERICA** *United States*: Eccles & Harold 1991 (physically active sports); Anderssen 1993; Tannehill et al. 1994; Gager et al. 1999; Guinn et al. 2000 (Hispanic adolescents)		**NORTH AMERICA** *United States*: EK Strong 1943 (poker, chess, billiards); Quaterman et al. 1996 (college, Blacks)
No signif. difference						
Greater in females						

6.2.4.4. Interest in Participating in Extra-Curricular Activities

One study in Table 6.2.4.4 shows females prefer participating in organized extra-curricular school activities, such as hobbies, games, and plays, more than do males.

Table 6.2.4.4. Interest in participating in extra-curricular activities.

Nature of Any Dif-ference				Postpubertal		
				Adolescent		
Greater in males						
No signif. difference						
Greater in females				**NORTH AMERICA** *United States*: Marini 1978a		

6.2.4.5. Interest in Aesthetic Aspects of Sports

The sort of sports in which females express greater interest than do males are those in which aesthetic expression is emphasized, as opposed to such things as strength and speed (Table 6.2.4.5). Examples would include dancing, gymnastics, and ice skating.

Table 6.2.4.5. Interest in aesthetic aspects of sports.

Nature of Any Dif-ference	Prepubertal			Adolescent or Adult		
			Childhood			
Males more						
No signif. difference						
Females more			**NORTH AMERICA** *United States*: Smoll & Schutz 1980; Birtwistle & Brodie 1991	**NORTH AMERICA** *United States*: Hildreth 1933 (bridge, golf, tennis, croquet, social dancing)		

6.2.4.6. Interest in Athletic Activities in General

Research has consistently found that males have a greater interest in being involved in athletic activities than is true of females (Table 6.2.4.6).

Table 6.2.4.6. Interest in athletic activities in general.

Nature of Any Difference	Adolescent/Adult
	Adolescent
Males more	**EUROPE** *Britain*: Hamond 1945; *Iceland*: R Vilhjalmsson & Kristjansdottir 2003 (sports clubs/membership) **NORTH AMERICA** *United States*: Hildreth 1933 (football, baseball, boxing, wrestling); FH Lund 1944; Eccles & Harold 1991 (doing well in sports important); Eccles et al. 1993 (doing well in sports important); Wiffield & Eccles 1994 (doing well in sports important); Wigfield et al. 1997 (doing well in sports important); Freddricks & Eccles 2002 (doing well in sports important); Jacobs et al. 2002 (doing well in sports important); KE Miller et al. 2005 ("jock identity")
No signif. difference	
Females more	

6.2.5. Sex-Related Preferences, Desires, and Interests

Studies having to do with preference and interest variables of a sex-related nature are presented in the following tables.

6.2.5.1. Interest in One's Own Physical Appearance/Attractiveness

When it comes to personal appearance and one's own attractiveness, females have been found to take more of an interest than do males (Table 6.2.5.1).

Table 6.2.5.1. Interest in one's own physical appearance/attractiveness.

Nature of Any Difference	Prepubertal	Postpubertal	
	Early Childhood	Adolescent	Adult
Males more			
No signif. difference			
Females more	**NORTH AMERICA** *United States*: Pitcher & Schultz 1983:95	**EUROPE** *Sweden*: Bergstrom et al. 2000	**EUROPE** *Sweden*: Lindwall 2004a (college) **NORTH AMERICA** *United States*: EA Hart et al. 1989

6.2.5.2. Perceived Attractiveness of Genitals

One study found males considering the genitals of both sexes more attractive that did females (Table 6.2.5.2).

Table 6.2.5.2. Perceived attractiveness of genitals.

Nature of Any Difference	Postpubertal
	Adult
Males more	**NORTH AMERICA** *United States*: Reinholtz & Muehlenhard 1995 (of both sex, college)
No signif. difference	
Females more	

6.2.5.3. Specificity in Objects of Sexual Arousal

A few studies have concluded that males are more discriminating than females in terms of using the physical features of others to assess the extent to which these others are sexually attractive to them (Table 6.2.5.3).

Table 6.2.5.3. Specificity of objects of sexual arousal.

Nature of Any Difference	Postpubertal
	Adult
Males more	**NORTH AMERICA** *United States*: Steinman et al. 1981; Wincze & Qualls 1984 (among homosexuals); Chivers & Bailey 2004; Chivers & Bailey 2005:117
No signif. difference	
Females more	

6.2.5.4. Preference for Masculine Sex Roles

Predictably, all available studies have found males expressing a greater preference than females for masculine sex roles (Table 6.2.5.4).

Table 6.2.5.4. Preference for masculine sex roles.

Nature of Any Dif-ference	Prepubertal		Postpubertal
	Early Childhood	Childhood	Adult
Males more	**NORTH AMERICA** *United States*: Rabban 1950*; Brown 1956*; Fauls & Smith 1956; Brown 1957*; EW Goodenough 1957; Brown 1958*	**NORTH AMERICA** *United States*: Raban 1950*; Brown 1956*; Brown 1957*; Brown 1958*	**NORTH AMERICA** *United States*: Terman & Miles 1936 (young & full)
No signif. difference			
Females more			

6.2.5.5. Preference for Same-Sex Sex Roles

Males have been found to have stronger preferences for exhibiting same-sex sex roles than is true for females (Table 6.2.5.5).

Table 6.2.5.5. Preference for same-sex sex roles.

Nature of Any Dif-ference	Prepubertal		Postpubertal
	Early Childhood	Childhood	Adult
Males more	**NORTH AMERICA** *United States*: Kagan 1964	**NORTH AMERICA** *United States*: Rabban 1950; D Lynn 1959; Seward 1964	**NORTH AMERICA** *United States*: Rudy 1968
No signif. difference			
Females more			

6.2.5.6. Sexual Attraction in General/Falling in Love/Having Crushes

A couple of studies indicate that females are more likely than males to have been in love or to have had a crush on someone (Table 6.2.5.6).

Table 6.2.5.6. Sexual attraction in general/falling in love/having crushes.

Nature of Any Dif-ference	Postpubertal	Multiple Age Categories
	Adult	
Males more	**NORTH AMERICA** *United States*: Rubin et al. 1981 (college, fall in love)	
No signif. difference		
Females more	**NORTH AMERICA** *United States*: PC Regan et al. 2004:670 (been in love, college) **OCEANIA** *New Zealand*: Dickson et al. 1993 (young); Dickson et al. 2003 (same-sex attraction)	**NORTH AMERICA** *United States*: Hurlock & Klein 1934 (remember having had at least one homosexual crush in childhood or adolescence)

6.2.5.7. Sexual Attraction to One's Own Sex

While the vast majority of males and females are sexually attracted almost exclusively to members of the opposite sex, a minority are not. Table 6.2.5.7 shows the results from studies that have compared the proportions of males and females who are attracted to their own sex. It indicates that among adults, males exhibit higher rates of homosexual preferences than do females, especially regarding more or less exclusive life-long homosexual preferences. To illustrate the magnitude of the differences, a U.S. study found that whereas 2.4% of males reported being exclusively attracted to other males, only 0.3% of females reported being exclusively attracted to other females (Laumann et al. 1994:313). In the case of adolescents, however, studies generally indicate that erotic attractions to one's own sex are virtually equal for males and females, and possibly more common among females.

Table 6.2.5.7. Sexual attraction to one's own sex.

Nature of Any Difference	Postpubertal	
	Adolescent	Adult
More males attracted to same sex		**EUROPE** *Germany*: Warczok 1988:182 **NORTH AMERICA** *United States*: Laumann et al. 1994:313; L Ellis et al. 2005:570 (college); WD Mosher et al. 2005:30* (homosexuals)
No signif. difference	**EUROPE** *Britain*: Sell et al. 1995* **OCEANIA** *Guam*: Pinhey & Millman 2004:7 (homosexual or bisexual attractions)	
More females attracted to same sex	**EUROPE** *France*: Sell et al. 1995* (homosexual feelings) **NORTH AMERICA** *United States*: Remafedi et al. 1992:717; Sell et al. 1995*	**NORTH AMERICA** *United States*: Hurlock & Klein 1934 (crushes); WD Mosher et al. 2005:30* (bisexuals) **OCEANIA** *New Zealand*: Dickson et al. 1993 (young); Dickson et al. 2003 (same-sex attraction)

6.2.5.8. Sexual Attraction to the Opposite Sex

Gender differences in the degree to which subjects have an interest in or attraction to the opposite sex have been investigated in a few studies. As shown in Table 6.2.5.8, these studies have not shown consistent patterns.

Table 6.2.5.8. Sexual attraction to the opposite sex.

Nature of Any Difference	Prepubertal	Postpubertal	
	Childhood	Adolescent	Adult
Males more			**NORTH AMERICA** *United States*: Pfeiffer 1969 (elderly); Pfeiffer & Davis 1972; Pfeiffer et al. 1972
No signif. difference		**NORTH AMERICA** *United States*: Burks et al. 1930* (gifted)	**OCEANIA** *Australia*: McConaghy & Zamir 1995:498 (medical school students, attraction) **NORTH AMERICA** *United States*: WD Mosher et al. 2005:30
Females more	**NORTH AMERICA** *United States*: Burks et al. 1930* (gifted subjects)		

6.2.5.9. Speed of Falling in Love

The speed with which a person falls in love (usually with a member of the opposite sex) has been studied extensively. As shown in Table 6.2.5.9, the results have been mixed, with the possibility of age variations. Specifically, whereas falling in love by children seems to occur more quickly in females than in males, among adults, the opposite has been documented most often.

Table 6.2.5.9. Speed of falling in love.

Nature of Any Difference	Prepubertal	Postpubertal	
	Childhood	Adolescent	Adult
Males more			**NORTH AMERICA** *United States*: Pfeiffer 1969 (elderly); Kanin et al. 1970; Pfeiffer & Davis 1972; Pfeiffer et al. 1972; CT Hill et al. 1976; TL Huston et al. 1981; RF Baumeister et al. 1993; Baumeister et al. 1993 (college)
No signif. difference		**NORTH AMERICA** *United States*: Burks et al. 1930* (intellectually gifted subjects)	**OCEANIA** *Australia*: McConaghy & Zamir 1995:498 (medical school students, attraction) **NORTH AMERICA** *United States*: WD Mosher et al. 2005:30
Females more	**NORTH AMERICA** *United States*: Burks et al. 1930* (intellectually gifted subjects)		

6.2.5.10. Age of Onset of Romantic Interests

Table 6.2.5.10 suggests that females exhibit an interest in romantic relationships earlier than do males.

Table 6.2.5.10. Age of onset of romantic interests.

Nature of Any Difference	Postpubertal
	Adolescent
Males earlier	
No signif. difference	
Females earlier	**NORTH AMERICA** *United States*: Willoughby 1935; EH Campbell 1939 (young)

6.2.5.11. Desire for Promiscuous Sexual Relationships/Numerous Sex Partners

Males have been found to have greater desires for sexual relationships with numerous partners than do females (Table 6.2.5.11).

Table 6.2.5.11. Desire for promiscuous sexual relationships/numerous sex partners.

Nature of Any Difference	Postpubertal	Multiple Age Categories
	Adult	
Males more	**LATIN AMERICA** *Columbia*: Alzate & Villegas 1994 (college) **NORTH AMERICA** *Canada*: Meston et al. 1996 (young); *United States*: RA Lewis & Burr 1975 (more female college students intended to marry first sex partner); MS Clark & Hatfield 1989 (college); BJ Ellis & Symons 1990 (college, fantasies); Thiessen & Ross 1990:303 (college); TW Smith 1991; DM Buss & Schmitt 1993 (college); LC Miller & Fishkin 1997; DM Buss & Schmitt 2001:67 (college); Mathes et al. 2002; Pedersen et al. 2002 (college) **INTERNATIONAL** *Multiple Societies*: DP Schmitt 2003	**NORTH AMERICA** *United States*: Gagnon & Simon 1973 (more females intended to marry first sex partner); Seltzer et al. 1997:7
No signif. difference		
Females more		

6.2.5.12. Preference for Long-Term Sexual/Mating Relationships

Females appear to have a stronger preference for establishing long-term sexual/mating relationships than is the case for males (Table 6.2.5.12).

Table 6.2.5.12. Preference for long-term sexual/mating relationships.

Nature of Any Difference	Postpubertal
	Adult
Males more	
No signif. difference	
Females more	**NORTH AMERICA** *United States*: Deaux & Hanna 1984 (personals ads); Sitton & Rippee 1986 (lonely hearts ads); S Davis 1990 (personals ads)

6.2.5.13. Preferring Short Time Between Sexual Attraction and Sexual Intimacy

Studies that have asked males and females in young adulthood how much time they would prefer to elapse between their being sexually attracted to someone and becoming sexually intimate with that person have consistently found males preferring a shorter time interval than do females (Table 6.2.5.13).

Table 6.2.5.13. Preferring short time between sexual attraction and sexual intimacy.

Nature of Any Difference	Postpubertal
	Adult
Males more	**NORTH AMERICA** *United States*: Henley 1977 (young); Davis 1978 (young); McCabe 1987 (young); Sadalla et al. 1987 (young); Byers & Lewis 1988 (college); DM Buss & Schmitt 1993 (young); Herold & Mewhinney 1993 (when dating); Sprecher et al. 1995 (college); LL Cohen & Shotland 1996 (young); DM Buss & Schmitt 2001:67 (college, when dating)
No signif. difference	
Females more	

6.2.5.14. Interest in Sex (Strength of Sex Drive)

As shown in Table 6.2.5.14, a large number of studies have consistently revealed that males have a greater interest in experiencing sex more often and under a greater variety of circumstances than is true for females. Overall, while Hyde and DeLamater (1997) questioned whether males have a stronger sex drive than females, the present review supports PC Regan and Berscheid (1999:59) and Baumeister et al. (2001:242) in concluding that there is essentially no doubt that the sex drive of males surpasses that of females.

Table 6.2.5.14. Interest in sex (strength of sex drive).

Nature of Any Difference					Postpubertal	
					Adolescent	Adult
Males more					**LATIN AMERICA** *Columbia*: Useche et al. 1990 (stronger sex drive) **NORTH AMERICA** *United States*: Buzwell & Rosenthal 1996 (stronger sex drive)	**ASIA** *Japan*: Asayama 1975 (college, stronger sex drive) **EUROPE** *Finland*: Sievers et al. 1974 (married couple); *Germany*: von Sydow 2002 (consider variety of sexual activities appealing); *Sweden*: Bergstrom-Walan & Nielsen 1990 (elderly, desire a greater variety of sexual activity, couples want sex more often, important in marital relations) **NORTH AMERICA** *United States*: Driscoll & Davis 1971 (desire not to be virgins); Pfeiffer et al. 1972 (full/middle-age adult, stronger sex drive); Ard 1977 (married couples, want sex more often); AP Bell & Weinberg 1978 (homosexuals, stronger sex drive); GW Mercer & Kohn 1979 (college, stronger sex drive); P Blumstein & Schwartz 1983 (married couples); McCabe & Collins 1984 (college, prefer more frequent sex); Carrol et al. 1985 (college, stronger sex drive); Mehrabian & Stanton-Mohr 1985 (stronger sex drive); McCabe 1987 (college, prefer more frequent sex); Bretschneider & McCoy 1988 (elderly, stronger sex drive); Byers & Lewis 1988 (college, dating couples); Leigh 1989 (stronger sex drive); JC Jones & Barlow 1990 (stronger sexual urges, self-report); JG Beck et al. 1991 (college, stronger sex drive); Julien et al. 1992 (married, want sex more often); Wiederman 1993 (personal ads); Laumann et al. 1994 (desire a greater variety of sexual activity, consider variety of sexual activities appealing); LL Cohen & Shotland 1996; Johannes & Avis 1997 (stronger sex drive); Trudel et al. 1997 (married couples, stronger sex drive); WC Pedersen et al. 2002 (desire more sex partners); Chivers & Bailey 2005:116 **OCEANIA** *Australia*: K Dempsey 2002:103 (married couples, desire more sex with spouse)
No signif. difference						
Females more						

6.2.5.15. Positive (Less Negative) Attitude Toward First Sexual Encounter

Males have been consistently found to have more positive (or less negative) feelings with reference to their first sexual encounter (which usually occurred premaritally; Table 6.2.5.15).

Table 6.2.5.15. Positive (less negative) attitude toward first sexual encounter.

Nature of Any Difference					Postpubertal		Mutiple Age Categories
					Adolescent	Adult	
Males more					**NORTH AMERICA** *United States*: A Hass 1979 (less guilt); RC Sorensen 1972 (less guilt)	**EUROPE** *Britain*: Schofield 1973 (less guilt, young adult) **NORTH AMERICA** *United States*: A Bell et al. 1981 (less guilt); Darling et al. 1992 (less guilt, college); Sprecher et al. 2001 (less guilt, college)	**NORTH AMERICA** *United States*: W Simon & Gagnon 1968 (less guilt)
No significant difference							
Females more							

6.2.5.16. Age of Peak Sexual Interest/Sex Drive

The available research has indicated that males experience their peek sexual interest earlier (usually in their teens and 20s) than is the case for females (most commonly in their 30s; Table 6.2.5.19).

Table 6.2.5.16. Age of peak sexual interest/sex drive.

Nature of Any Difference						Postpubertal	Multiple Age Categories
						Adult	
Males earlier						**NORTH AMERICA** *United States*: Wiederman 2001	**NORTH AMERICA** *Canada*: Schmitt et al. 2002 (college); *United States*: Barr et al. 2002
No signif. difference							
Females earlier							

6.2.5.17. Enjoyment of Sex

Studies in which both sexes have been asked to indicate the extent to which they enjoy sexual intercourse have concluded that males do so to a greater extent than females do on average (Table 6.2.5.17).

Table 6.2.5.17. Enjoyment of sex.

Nature of Any Difference					Postpubertal	
						Adult
Males more						**EUROPE** *Sweden*: Weinberg et al. 1995:424* **NORTH AMERICA** *United States*: Darling & Davidson 1987 (first sexual pre-marital experience); DeLamater 1987; Weinberg et al. 1995:424*
No signif. difference						
Females more						

6.2.5.18. Sexual Arousal in General

Numerous studies have sought to determine the extent to which men and women are sexually aroused by various types of erotic stimuli. Especially regarding visual forms of such stimuli, males report experiencing higher sexual arousal. In the case of linguistically described erotic stimuli, most studies have found no significant gender differences (Table 6.2.5.18).

Table 6.2.5.18. Sexual arousal in general.

Nature of Any Difference					Postpubertal	
						Adult
Males more						**EUROPE** *Germany*: Schmidt & Sigusch 1970 (college, erotic film); Schmidt 1975 (college, erotic film); *Sweden*: Levi 1969 (college, erotic film) **NORTH AMERICA** *United States*: Mosher 1973 (college, erotic film); Steele & Walker 1974 (college, erotic slides); Malamuth & Check 1980 (college, erotic reading); Sapolsky & Zillman 1981 (college, erotic films); Przybyla & Byrne 1984 (college, erotic slides); Norris 1989 (college, erotic reading); Norris 1991 (college, erotic reading); Mosher & MacIan 1994 (college students, erotic film)
No signif. difference						**EUROPE** *Germany*: Sigusch et al. 1970 (college, physiological reasons) **NORTH AMERICA** *United States*: Paris & Goodstein 1966 (college, erotic reading); Mosher & Abramson 1977 (college, erotic film); Pawlowski 1979 (ages 18-30, erotic films); Perlman & Weber 1979 (college, erotic reading); Malamuth et al. 1980 (college, erotic reading); Miller et al. 1980 (college, erotic slides); Saunders et al. 1985 (college, erotic films); Malamuth et al. 1986 (college, erotic reading)
Females more						**NORTH AMERICA** *United States*: Mann et al. 1971 (erotic film)

6.2.5.19. Emotional Commitment (Feelings of Closeness) to One's Spouse/Mate

A few studies have compared males and females who have an established relationship with a member of the opposite sex regarding the extent of their emotional commitment or feelings of closeness. All of these studies have concluded that females have stronger commitments than do males (Table 6.2.5.19).

Table 6.2.5.19. Emotional commitment (feelings of closeness) to spouse/mate.

Nature of Any Difference					Postpubertal	
					Adolescent	Adult
Males more						
No signif. difference						
Females more					**NORTH AMERICA** *United States*: Murstein & Holden 1979:625	**NORTH AMERICA** *United States*: Rainwater 1966 (married); Peplau et al. 1977 (young); JM Bailey et al. 1994:1088 (college)

6.2.5.20. Particularity in Selecting Sex Partners

Several American studies, one international study, and one on the green poison-dart frog examined choosiness in selecting sex partners largely based on self-reports. All of these studies have indicated that females tend to be choosier than is the case for males (Table 6.2.5.20).

Table 6.2.5.20. Particularity in selecting sex partners.

Nature of Any Difference					Postpubertal	
						Adult
Males more						
No signif. difference						
Females more						**AMPHIBIAN** *Frog*: K Summers 1989 (green dart-poison frog) **NORTH AMERICA** *United States*: Hatkoff & Lasswell 1979; Hendrick et al. 1984 (college); DM Buss & Barnes 1986; JA Howard et al. 1987; MS Clark & Hatfield 1989 (young); Kenrick & Trost 1989 (college); RD Clark 1990 (young); DT Kenrick et al. 1993 (young) **INTERNATIONAL** *Multiple Countries*: E Hatfield & Sprecher 1995 (college)

6.2.5.21. Emotional Closeness as a Major Motivation for Having Sex

Three studies have indicated that females are more motivated by feelings of emotional closeness in having sex than is true from males (Table 6.2.5.21).

Table 6.2.5.21. Emotional closeness as a major motivation for having sex.

Nature of Any Difference					Postpubertal	
						Adult
Males more						
No signif. difference						
Females more						**NORTH AMERICA** *United States*: FS Christopher & Cate 1984; JL Carroll et al. 1985*; Leigh 1989*

6.2.5.22. Sexual Stimulation as a Major Motivation for Having Sex

The available research surrounding which sex is most motivated to have sex by the pleasure of sexual stimulation and the achievement of orgasm has indicated that males mention this more often than do females (Table 6.2.5.22).

Table 6.2.5.22. Sexual stimulation as a major motivation for having sex.

Nature of Any Difference					Postpubertal	
						Adult
Males more						**NORTH AMERICA** *United States*: JL Carroll et al. 1985* (orgasm/sexual stimulation); Leigh 1989* (orgasm/sexual stimulation)
No signif. difference						
Females more						

6.2.5.23. Sexual Arousal From Clothing and Apparel

One study reported that men were more often sexually aroused by clothing worn by women than women were by clothing worn by men (Table 6.2.5.23).

Table 6.2.5.23. Sexual arousal from clothing and apparel.

Nature of Any Difference					Postpubertal	
						Adult
Males more						**NORTH AMERICA** *Canada*: Langstrom & Zucker 2005 (opposite sex clothing)
No signif. difference						
Females more						

6.2.5.24. Preference for Sexually-Oriented Erotica

Most studies have found that men express a stronger preference for sexually explicit erotic material than do women, especially in the case of visual erotica (Table 6.2.5.24). Most of the exceptions involve erotica that are listened to or read.

Table 6.2.5.24. Preference for sexually-oriented erotica.

Nature of Any Difference					Postpubertal	
						Adult
Males more						**EUROPE** *Italy*: Costa et al. 2003; *Netherlands*: Dekker et al. 1985; Dekker & Everaerd 1988 **NORTH AMERICA** *Canada*: W Fisher et al. 1988 (college); *United States*: G Schmidt et al. 1973* (college); Griffitt et al. 1974; Herrell 1975; Dunwoody & Pezdak 1979; Check & Malamuth 1983; Garcia et al. 1984; Becker & Byrne 1985; Kelley & Musialowski 1986; Geer & McGlone 1990 (college); Geer 1996 (college)
No signif. difference						**NORTH AMERICA** *Canada*: Fisher & Byrne 1978; *United States*: Byrne & Lamberth 1971; Griffitt 1973; Griffitt & Kaiser 1978; Hatfield et al 1978; Kelley et al. 1983; Kelley 1984-1985
Females more						**EUROPE** *West Germany*: Schmidt et al. 1973* (college, reading erotic stories) **NORTH AMERICA** *United States*: Jakobovits 1965 (erotic literature); Heiman 1977 (audiotaped erotica)

6.2.5.25. Preference for Relationship-Oriented Erotica

According to Table 6.2.5.25, women prefer erotic material that emphasizes courtship and the establishment of a romantic relationship more than do men.

Table 6.2.5.25. Preference for relationship-oriented erotica.

Nature of Any Difference					Postpubertal	
						Adult
Males more						
No signif. difference						
Females more						**NORTH AMERICA** *Canada*: W Fisher et al. 1988 (young); *United States*: G Schmidt et al. 1973 (young); Geer & McGlone 1990 (young); Geer 1996 (young)

6.2.5.26. Importance of Relational (Emotional Sharing) Aspects of Sexuality

According to Table 6.2.5.26, women care more about the relational and emotional connective aspects of sexuality than do men.

Table 6.2.5.26. Importance of relational (emotional sharing) aspects of sexuality.

Nature of Any Difference					Postpubertal	
						Adult
Males more						
No signif. difference						
Females more						**NORTH AMERICA** *United States*: Spanier & Margolis 1983; FS Christopher & Cate 1984 (love as a motivation for sex); Denny et al. 1984 (college); JL Carroll et al. 1985 (love as a motivation for sex); Purnine et al. 1994 (college); SP Glass & Wright 1985; H Cooper et al. 1999 (young)

6.2.5.27. Interest in (Arousal by) Tactile Aspects of Sexuality

The limited research on the extent to which males and females are aroused by tactile aspects of sexuality have reached seemingly inconsistent conclusions (Table 6.2.5.27).

Table 6.2.5.27. Interest in (arousal by) tactile aspects of sexuality.

Nature of Any Difference					Postpubertal	
					Adolescent	Adult
Males more						**NORTH AMERICA** *United States*: JM Bailey et al. 1994 (college)
No signif. difference						
Females more					**NORTH AMERICA** *United States*: Knoth et al. 1988:83	

6.2.5.28. Interest in (Arousal by) Visual Aspects of Sexuality

With a few exceptions, studies have concluded that males are more likely than females to be interested in and aroused by visual aspects of sexuality (Table 6.2.5.28). This conclusion concurs with a meta-analysis performed by Muren and Stockton (1997).

Table 6.2.5.28. Interest in (arousal by) visual aspects of sexuality.

Nature of Any Difference					Postpubertal		
					Adolescent	Adult	
More in males					**NORTH AMERICA** *United States*: Knoth et al. 1988:82	**NORTH AMERICA** *Canada*: Simms 1967; *United States*: Abelson et al. 1970 (college, visual erotica); Byrne & Lamberth 1970 (college); Schmidt & Sigusch 1970 (college); G Schmidt & Sigusch 1970 (erotic films); Mosher 1973 (college, erotics films); Izard & Caplan 1974; Steele & Walker 1974 (college); Griffitt 1975 (college); Heiman 1977 (college); Hatfield et al. 1978 (college); JM Bailey et al. 1994:1088; BJ Ellis & Symons 1990; H Cooper et al. 1999	
No signif. difference						**NORTH AMERICA** *United States*: Veitch & Griffit 1980	
More in females						**NORTH AMERICA** *United States*: Jakobovits 1965; Chivers & Bailey 2005 (college, visual depictions of sex by chimpanzees)	

6.2.5.29. Separating Sex and Romance

According to one study, males are more inclined to separate their desires for sex and their romantic feelings toward a dating partner (Table 6.2.5.29).

Table 6.2.5.29. Separating sex and romance.

Nature of Any Difference					Postpubertal		
						Adult	
Males more						**NORTH AMERICA** *United States*: Mongeau et al. 2004 (dating couples)	
No significant difference							
Females more							

6.2.5.30. Sexual Desire Diminished by Feelings of Anger and Anxiety

Two studies indicate that feelings of anger or anxiety do more to diminish sexual desires by women than by men (Table 6.2.5.30).

Table 6.2.5.30. Sexual desire diminished by feelings of anger and anxiety.

Nature of Any Difference					Postpubertal		
						Adult	
Males more							
No significant difference							
Females more						**NORTH AMERICA** *United States*: Bozman & Beck 1991; JG Beck & Bozman 1995	

6.2.6. Priorities in Sex and Marriage Partner Preferences

Many studies have been undertaken in recent years of mate preferences by males and females. These studies have been prompted in part by the application of evolutionary theory to the study of mate preferences and choices. In particular, the idea that females can nearly always reproduce best when they have the long term assistance of a male who is a stable provider of resources, while males can best reproduce by mating with females who are relatively young and healthy, has driven a great deal of research on sex differences in mate preferences. This evolutionary reasoning has lead to the predictions that females would usually emphasize social status and loyalty in choosing mates, while males would focus more on youthfulness and physical beauty (Buss & Barnes 1986; Wiederman 1993; Greenlees & McGrew 1994).

6.2.6.1. Preference for a Mate Who Is Physically Attractive

Most of the research on gender differences in preferences for mates who are physically attractive have involved analyzing the contents of advertisements placed by men and women who are seeking members of the opposite sex for the purpose of establishing a romantic relationship. As shown in Table 6.2.6.1, these studies have consistently shown that males emphasize physical attractiveness as criteria in mate choice more than do females. This conclusion meshes with one reached in a meta-analysis by Feingold (1991:357).

Table 6.2.6.1. Preference for a mate who is physically attractive.

Nature of Any Difference	Postpubertal	Multiple Age Categories
	Adult	
Males more	**AFRICA** *Morocco*: A Walter 1997; *Nigeria*: DM Buss & Schmitt 2001:77* **ASIA** *China*: Chuang 2002; LT Higgins et al. 2002:84* (college); *India*: Husain & Kureshi 1983 (college); Husain & Firdous 1990:120 (college); Basu & Bajyasri 2001; *Indonesia*: DM Buss & Schmitt 2001:77*; *Japan*: Oda 2001; *Malaysia*: A Liston & Salts 1988* (college); *Thailand*: Knodel et al. 1997 **EUROPE** *Britain*: LT Higgins et al. 2002:84* (college); *Bulgaria*: DM Buss & Schmitt 2001:77*; *France*: Murstein 1976* (college); DT Kenrick et al. 1993*; *Germany*: Buss & Angleitener 1989*; DM Buss & Schmitt 2001:77*; *Spain*: Gil-Burmann et al. 2002:498 **MIDDLE EAST** *Israel*: Hetsroni 2002 (college, Jews & Arabs); *Jordan*: Buss et al. 1990:156 Khallad 2005:155 (good looks & youth) **NORTH AMERICA** *Canada*: Landolt et al. 1995 (young); *United States*: R Hill 1945 (college); R McGinnis 1958 (college); Coombs & Kenkel 1966 (college); E Walster et al. 1966; JW Hudson & Henze 1969 (college); Berscheid et al. 1971; Stroebe et al. 1971; Krebs & Adinolfi 1975; ST Morse et al. 1976; Murstein 1976* (college); AA Harrison & Saeed 1977 (lonely heart ads); Huston & Levinger 1978; Janda et al. 1981; Buss & Barnes 1986; Hirschman 1987 (personal ads); Sprecher et al. 1987; A Liston & Salts 1988* (college); Buss & Angleitener 1989*; Sprecher 1989b:591 (college); Sheppard & Strathman 1989 (college); S Davis 1990 (body shape, personal ads); Feingold 1990; Kenrick et al. 1990 (college); JE Smith et al. 1990 (body shape, personal ads); Rajecki et al 1991 (personal ads); Feingold 1992; Wiederman & Allgeier 1992:115 (college); Buss & Schmitt 1993 (college); DT Kenrick et al. 1993*; Pratto et al. 1993:122 (college); Wiederman 1993 (personal ads); Sprecher et al. 1994; Jensen-Campbell et al. 1995; R Cramer et al. 1996; Herz & Cahill 1997 (young); Regan 1998; McGuirl & Wiederman 2000:158 (college); P Regan et al. 2000; S Stewart et al. 2000 (college); DM Buss & Schmitt 2001:77*; Buunk et al. 2002; Herz & Inzlicht 2002 (college) **INTERNATIONAL** *Multiple Countries*: E Hatfield & Sprecher 1995:741 (college); Gottschall et al. 2004 (content analysis of folktales)	**EUROPE** *Britain*: R Dunbar 1995 **NORTH AMERICA** *United States*: AA Harrison & Saeed 1977; Bolig et al. 1984 (body shape, personal ads); Deaux & Hanna 1984; EC Hirschman 1987; S Davis 1990; JE Smith et al. 1990; FN Willis & Carlson 1993; Greenlees & McGrew 1994; E Goode 1996 (personal ads) **LATIN AMERICA** *Brazil*: de Sousa Campos 2002 (personal ads) **MIDDLE EAST** *Israel*: Peres & Meivar 1986
No signif. difference	**NORTH AMERICA** *United States*: Bolig et al. 1984; RS Lacey et al. 2004:127 (college)	
Females more		**EUROPE** *Spain*: Burmann et al. 2002

6.2.6.2. Preference for a Mate Who Is Taller (Relative to Oneself)

Numerous studies have found that females prefer mates who are taller than themselves to a much greater degree than males have such a preference (Table 6.2.6.2). In fact, male's preferences are usually for mates who are shorter than themselves.

Table 6.2.6.2. Preference for a mate who is taller (relative to oneself).

Nature of Any Difference	Postpubertal	
	Adolescent	Adult
Males more		
No signif. difference		
Females more	**NORTH AMERICA** *United States*: WE Hensley 1994	**ASIA** *India*: Husain & Firdous 1990 (college) **INTERNATIONAL** *Multiple Countries*: LT Higgins et al. 2002:81 (college) **NORTH AMERICA** *United States*: Cameron et al. 1977 (lonely heart ads); JS Gillis & Avis 1980 (college); M Lynn & Shurgot 1984 (lonely heart ads); E Hatfield & Sprecher 1986; Koestner & Wheeler 1988 (lonely heart ads); JA Sheppard & Strathman 1989 (college); Feingold 1990; Pratto et al. 1993:122 (college)

6.2.6.3. Preference for a Mate With Access to Resources (Wealth, High Income)

Females care about the financial status of their romantic partner more than men do. This is the unequivocal conclusion of a large number of studies (Table 6.2.6.3).

Table 6.2.6.3. Preference for a mate with access to resources (wealth, high income).

Nature of Any Difference					Postpubertal	Multiple Age Categories
					Adult	
Males more						
No signif. difference					**NORTH AMERICA** *United States*: Bolig et al. 1984	
Females more					**AFRICA** *Morocco*: A Walter 1997; *Zambia*: DM Buss & Schmitt 2001:83* **ASIA** *China*: LT Higgins et al. 2002:84* (college); *Japan*: DM Buss & Schmitt 2001:83*; *Malaysia*: A Liston & Salts 1988* (college); *Thailand*: Knodel et al. 1997 **EUROPE** *Britain*: LT Higgins et al. 2002:84* (college); *France*: Murstein 1976* (college); DT Kenrick et al. 1993*; *Germany*: Buss & Angleitener 1989*; *Yugoslavia*: DM Buss & Schmitt 2001:83* **MIDDLE EAST** *Israel*: Hetsroni 2002 (college) **NORTH AMERICA** *United States*: Murstein 1976* (college); DM Buss & Barnes 1986 (young); A Liston & Salts 1988* (college); Buss & Angleitener 1989*; Kenrick & Trost 1989 (young); Sprecher 1989b:591 (college); Kenrick et al. 1990 (young); Thiessen & Ross 1990:301 (college); Feingold 1992; Wiederman & Allgeier 1992:115 (college); DT Kenrick et al. 1993*; Pratto et al. 1993:122 (college); Kenrick et al. 1996 (college); S Stewart et al. 2000 (college); DM Buss & Schmitt 2001:83*; RS Lacey 2004 (college) **OCEANIA** *Austrailia*: DM Buss & Schmitt 2001:83* **INTERNATIONAL** *Multiple Countries*: DM Buss 1989a; Hatfield & Sprecher 1995 (college)	**MIDDLE EAST** *Israel*: Peres & Meivar 1986 **NORTH AMERICA** *United States*: AA Harrison & Saeed 1977; Deaux & Hanna 1984; EC Hirschman 1987; JE Smith et al. 1990; FN Willis & Carlson 1993

6.2.6.4. Preference for a Mate With High Social Status (or Status Potential)

A conclusion that is strongly supported by the research evidence is that females care more about the social status of their romantic partners or prospective mates than do men (Table 6.2.6.4).

Table 6.2.6.4. Preferences for a mate with high social status (or status potential).

Nature of Any Difference					Postpubertal	
					Adolescent	Adult
Stronger in males						
No signif. difference						
Stronger in females					**LATIN AMERICA** *Brazil*: de Sousa Campos 2002 (personal ads) **NORTH AMERICA** *United States*: Buunk et al. 2002; E Goode 1996 (personal ads)	**EUROPE** *Spain*: Burmann et al. 2002 **NORTH AMERICA** *Canada*: Landolt et al. 1995 (young); *United States*: Coombs & Kenkel 1966 (young); Cameron et al. 1977 (personal ads); AA Harrison & Saeed 1977 (personal ads); Sitton & Rippee 1986 (lonely heart ads); S Davis 1990 (personal ads); A Feingold 1990; JE Smith et al. 1990 (personal ads); Rajecki et al. 1991; Pratto et al. 1993:122 (college); Sprecher et al. 1994; Buunk et al. 2002 (highly educated); Herz & Inzlicht 2002 (young) **INTERNATIONAL** *Multiple Countries*: DM Buss 1989a (young); E Hatfield & Sprecher 1995:741 (college); K Wallen 1989 (college)

6.2.6.5. Preference for Dominance in a Mate (or a Mate Who is of High Status)

All available studies have concluded that females are more likely than males to express a preference for mates who are dominant or of high status (Table 6.2.6.5).

Table 6.2.6.5. Preference for dominance in a mate.

Nature of Any Difference					Postpubertal
					Adult
Males more					
No signif. difference					
Females more					**ASIA** *Japan*: Oda 2001 **EUROPE** *Spain*: Gil-Burmann et al. 2002:498 **NORTH AMERICA** *United States*: DM Buss & Barnes 1986 (college); Sadalla et al. 1987 (college); Kenrick & Keefe 1992 (college)

6.2.6.6. Preference for Intelligence in a Prospective Mate

One study found females emphasize the importance of intelligence more than males do in regard to selecting mates (Table 6.2.6.6).

Table 6.2.6.6. Preference for intelligence in a prospective mate.

Nature of Any Difference	Postpubertal
	Adult
Males more	
No signif. difference	**NORTH AMERICA** *United States*: Bolig et al. 1984
Females more	**INTERNATIONAL** *Multiple Countries*: E Hatfield & Sprecher 1995:741 (college)

6.2.6.7. Preference for a Mate Who Is Better Educated Than Oneself

A study that sought to determine whether a sex difference existed in preferences for the education level of their prospective mates found that females preferred a mate who was more educated than themselves to a greater degree than was true for males (Table 6.2.6.7).

Table 6.2.6.7. Preference for a mate who is better educated than oneself.

Nature of Any Difference	Postpubertal
	Adult
Males more	
No signif. difference	
Females more	**ASIA** *China*: LT Higgins et al. 2002 (college)

6.2.6.8. Preference for a Mate Who Is Ambitious/Industrious

Ambition and industriousness are more often listed as qualities they are looking for in a mate by women than by men (Table 6.2.6.8).

Table 6.2.6.8. Preference for a mate who is ambitious/industrious.

Nature of Any Dif-ference	Postpubertal	Multiple Age Categories
	Adult	
Males more		
No signif. difference		
Females more	**NORTH AMERICA** *United States*: Langhorne & Secord 1955 (young); JW Hudson & Henze 1969 (young); TD Kemper & Bologh 1980 (young); Pratto et al. 1993:122 (college, hard-working and industrious mates)	**NORTH AMERICA** *United States*: S Davis 1990

6.2.6.9. Preference for Honesty and Sincerity in One's Mate

Females are more likely than males to express a preference for honesty and sincerity in the mates they are seeking (Table 6.2.6.9).

Table 6.2.6.9. Preference for honesty and sincerity in one's mate.

Nature of Any Difference	Postpubertal
	Adult
Males more	
No signif. difference	
Females more	**NORTH AMERICA** *United States*: AA Harrison & Saeed 1977 (lonely heart ads); Deaux & Hanna 1984 (personal ads); Rajecki et al. 1991 (personal ads); Gonzales & Meyers 1993 (personal ads)

6.2.6.10. Preference for Fidelity/Virginity in One's Mate

Findings have been somewhat mixed with regard to having identified a gender difference in the tendency to prefer a mate who has not had (or will have) sex with any other person (Table 6.2.6.9).

Table 6.2.6.10. Preference for fidelity/virginity in one's mate.

Nature of Any Difference						Multiple Age Categories
Males more						**AFRICA** *Palestine*: DM Buss & Schmitt 2001:75*; *Zambia*: DM Buss & Schmitt 2001:75* **NORTH AMERICA** *United States*: DM Buss & Schmitt 2001:75*
No signif. difference						**ASIA** *China*: DM Buss & Schmitt 2001:75* **EUROPE** *Sweden*: DM Buss & Schmitt 2001:75* **NORTH AMERICA** *United States*: Pedersen et al. 2002 (college, desire for lifetime monogamy)
Females more						**EUROPE** *Spain*: Burman et al. 2002 (looked for expressions of fidelity in ads for mates)

6.2.6.11. Preference for a Mate Who Is Young (Relative to Oneself)

The tendency to prefer romantic mates who are younger than oneself is more prevalent among men. This is the conclusion of studies conducted in numerous countries (Table 6.2.6.11).

Table 6.2.6.11. Preference for a mate who is young (relative to oneself).

Nature of Any Difference					Postpubertal	Multiple Age Categories
					Adult	
Males more					**AFRICA** *Zambia*: DM Buss & Schmitt 2001:78* **ASIA** *China*: LT Higgins et al. 2002:80* (college); *Malaysia*: A Liston & Salts 1988* (college) **EUROPE** *Britain*: LT Higgins et al. 2002:80* (college); *France*: Murstein 1976* (college); DT Kenrick et al. 1993*; *Germany*: Buss & Angleitener 1989*; *Italy*: DM Buss & Schmitt 2001:78*; *Poland*: DM Buss & Schmitt 2001:78* **LATIN AMERICA** *Columbia*: DM Buss & Schmitt 2001:78* **MIDDLE EAST** *Jordan*: Khallad 2005:155 (good looks & youth) **NORTH AMERICA** *United States*: Murstein 1976* (college); C Cameron et al. 1977 (personal ads); AA Harrison & Saeed 1977 (lonely heart ads); Buss & Barnes 1986; A Liston & Salts 1988* (college); DM Buss 1989a* (college); Buss & Angleitener 1989*; Rajecki et al. 1991 (personal ads); Feingold 1992; Kenrick & Keefe 1992* (college); DT Kenrick et al. 1993*; Pratto et al. 1993:122 (college); Wiederman 1993 (college); JM Bailey et al. 1994:1088 (college); Kenrick et al. 1995 (college); Kenick et al. 1996*; DM Buss & Schmitt 2001:78*; Buunk et al. 2001; Buunk et al. 2002; Johannesen-Schmidt & Eagly 2002 (college) **INTERNATIONAL** *Multiple Countries*: DM Buss et al. 1989a* (young)	**EUROPE** *Germany*: Kummerling & Hassebrauck 2001:88; *Spain*: Burmann et al. 2002 **NORTH AMERICA** *Canada*: Quinsey et al. 1993; *United States*: Cameron et al. 1977 (SA); AA Harrison & Saeed 1977 (SA); Bolig et al. 1984 (SA); Kenrick & Keefe 1992*; Kenrick & Keefe 1997
No signif. difference						
Females more						

6.2.6.12. Preference for a Mate Who Is Older Than Oneself

All available research has concluded that females are more likely than males to express a preference for mates who are older than themselves (Table 6.2.6.12).

Table 6.2.6.12. Preference for a mate who is older than oneself.

Nature of Any Difference				Postpubertal		
				Adolescent	Adult	
Males more						
No signif. difference						
Females more				**NORTH AMERICA** *United States*: Kenrick et al. 1996; Elo et al. 1999 **INTERNATIONAL** *Multiple Countries*: Buss 1989; Kenrick & Keefe 1992	**AFRICA** *Zambia*: DM Buss & Schmitt 2001:78* **ASIA** *China*: LT Higgins et al. 2002:80* (college) **EUROPE** *Britain*: LT Higgins et al. 2002:80* (college); *Italy*: DM Buss & Schmitt 2001:78*; *Poland*: DM Buss & Schmitt 2001:78* **LATIN AMERICA** *Columbia*: DM Buss & Schmitt 2001:78* **NORTH AMERICA** *United States*: DM Buss 1989a* (college); Landry & Forrest 1995; DM Buss & Schmitt 2001:78* **INTERNATIONAL** *Multiple Countries*: DM Buss 1989a* (college)	

6.2.6.13. Preference for a Mate Who Is Religious

According to a couple of studies, females are more likely than males to prefer mates who are religious (Table 6.2.6.13).

Table 6.2.6.13. Preference for a mate who is religious.

Nature of Any Difference	Multiple Age Categories
Males more	
No signif. difference	
Females more	**NORTH AMERICA** *United States*: Bolig et al. 1984 (singles ads); Deaux & Hanna 1984 (singles ads)

6.2.6.14. Emphasize Practical Issues Over Love/Romance When Choosing Mates

According to one study, females were more likely than males to make their choices of mates on the basis of practical factors rather than simply on the basis of emotions and attraction (Table 6.2.6.14).

Table 6.2.6.14. Emphasize practical issues over love/romance when choosing mates.

Nature of Any Difference	Postpubertal
	Adult
Males more	
No signif. difference	
Females more	**NORTH AMERICA** *United States*: Rubin 1973 (young)

6.2.6.15. Preference for/Attitude Toward Interracial Dating

The one available study on sex differences in people's attitudes toward inter-racial dating concluded that males expressed more willingness to do so than women (Table 6.2.6.15).

Table 6.2.6.15. Preference for/attitude toward interracial dating.

Nature of Any Difference	Postpubertal	
	Adolescent	Adult
Males more positive attitude	**NORTH AMERICA** *United States*: J Todd et al. 1992* (more positive attitude toward interracial dating)	**NORTH AMERICA** *United States*: J Todd et al. 1992* (college, more willing to date interracially)
No signif. difference		
Females more positive attitude		

6.2.6.16. Desiring to Discuss Marital Problems

Several studies have asked men and women who are or were married if they would be amenable to discussing any marital problems they might have with an outside party. In all cases, more females than males expressed a desire to do so (Table 6.2.6.16).

Table 6.2.6.16. Desiring to discuss marital problems.

Nature of Any Difference	Postpubertal
	Adult
Males more	
No signif. difference	
Females more	**NORTH AMERICA** *United States*: Christensen 1987; Christensen & Heavey 1990 (married couples); Christensen & Shenk 1991 (divorcing couples); Heavey et al. 1993 (married couples); Gottman & Carerre 1994 (married couples); Levenson et al. 1994 (married couples); Heavey et al. 1995 (married couples)

6.2.6.17. Willing to Allow One's Parents to Influence Marriage Choice

One survey asked men and women if they would be willing to allow their parents to have a say in who they married. It revealed that women were more willing to do so than men (Table 6.2.6.17).

Table 6.2.6.17. Willing to allow one's parents to influence marriage choice.

Nature of Any Difference	Postpubertal
	Adult
Males more	
No signif. difference	
Females more	**NORTH AMERICA** *United States*: A Bates 1942 (young)

6.2.7. Preferences for Cultural Artifacts

Research surrounding male and female preferences for various types of cultural artifacts is examined in the following subsection.

6.2.7.1. Preferences for Physical (Versus Social) Objects

In a couple studies, children were allowed to choose between viewing or playing with physical and social objects. In both cases, males were more likely than females to spend time with physical over social objects (Table 6.2.7.1).

Table 6.2.7.1. Preference for physical (versus social) objects.

Nature of Any Difference	Prepubertal	
	Infant	Early Childhood
Males more	**NORTH AMERICA** *United States*: Connellan et al. 2000 (neonate)	**EUROPE** *Italy*: Hubsch & Reininger 1931
No signif. difference		
Females more		

6.2.7.2. Preference for Clothing Fashions

The one study that was located concerning sex differences in preferences for clothing fashions concluded that females exhibited a stronger preference than did males (Table 6.2.7.2).

Table 6.2.7.2. Preference in clothing fashions.

Nature of Any Difference	Multiple Age Categories
Males more	
No signif. difference	
Females more	**NORTH AMERICA** *United States*: Stith & Goldsmith 1989:249

6.2.7.3. Musical Instrument Preferences

The available research on gender differences in the types of musical instruments preferred have largely revealed that males prefer instruments that are larger, louder, and with lower pitched tones ("masculine instruments") than those preferred by females (Table 6.2.7.3).

Table 6.2.7.3. Musical instrument preferences.

Nature of Any Difference	Prepubertal		Postpubertal	
	Early Childhood	Childhood	Adolescent	Adult
Males more		**NORTH AMERICA** *United States*: Abeles & Porter 1978* (low pitched instruments); Delzell & Leppla 1992 (low pitched instruments); O'Neill & Boulton 1996 (older school age, masculine instruments); AC Harrison & O'Neill 2000* (lower pitched "masculine" instruments, experiment only slightly shifted preference); Pickering & Repacholi 2002	**NORTH AMERICA** *United States*: Crowther & Durkin 1982 (high school, masculine instruments)	**NORTH AMERICA** *United States*: Griswold & Chroback 1981 (college, low pitched instruments)
No signif. difference	**NORTH AMERICA** *United States*: Abeles & Porter 1978*			
Females more				

6.2.8. Preferences Surrounding Communication Media

A number of research projects have been aimed toward identifying gender differences in preferences for such things as television programs and computer games. Findings are reviewed below.

6.2.8.1. Preference for Watching Movies and Television Programs in General

According to one study, females expressed a stronger preference for watching movies and television programs overall than did males (Table 6.2.8.1).

Table 6.2.8.1. Preference for watching movies and television programs in general.

Nature of Any Difference				Adolescent or Adult	
				Adolescent	
Males more					
No signif. difference					
Females more				**NORTH AMERICA** *United States*: Hildreth 1933	

6.2.8.2. Preference for Same-Sex (Versus Opposite-Sex) Favorite TV Character

According to the two studies cited in Table 6.2.8.2, both boys and girls preferred watching boys in staring roles in television programs more than watching girls.

Table 6.2.8.2. Preference for same-sex (versus opposite sex) favorite TV character.

Nature of Any Difference	Prepubertal					
				Childhood		
Males more				**NORTH AMERICA** *United States*: Eisenstock 1984; C Hoffner 1996		
No signif. difference						
Females more						

6.2.8.3. Preference for Adventure/Exploration Movies and Television Programs

The two available studies on sex differences in preference for adventure and exploration progams both concluded that males exhibits stronger preferences than did females (Table 6.2.8.3).

Table 6.2.8.3. Preference for adventure/exploration movies and televisions programs.

Nature of Any Difference	Prepubertal					
				Childhood		
Males more				**NORTH AMERICA** *United States*: AM Mitchell 1929; Baumgarter & Tramer 1945		
No signif. difference						
Females more						

6.2.8.4. Preference for Humor/Cartoons/Comedic Mass Entertainment

Research findings vary regarding sex differences in preferences for humorous mass entertainment. Both age and the exact type of humor may bear on the inconsistencies (Table 6.2.8.4).

Table 6.2.8.4. Preference for humor/cartoons/comedic mass entertainment.

Nature of Any Difference					Postpubertal	
			Early Childhood		Adolescent	Adult
Males more			**NORTH AMERICA** *United States*: Comstock 1991 (violent cartoons)		**NORTH AMERICA** *United States*: Abbott 1927	
No signif. difference						**EUROPE** *Britain*: Lowis & Nieuwoudt 1995; Lowis 2002 (college); Lowis 2003 (college)
Females more			**NORTH AMERICA** *United States*: Comstock 1991 (family-based cartoons such as "Flintstones")			

6.2.8.5. Preference for Pornography

Most studies have concluded that males have a stronger preference for pornography than do females (Table 6.2.8.5).

Table 6.2.8.5. Preference for pornography.

Nature of Any Difference					Postpubertal	
						Adult
Males more positive						**NORTH AMERICA** *United States*: E Hess & Polt 1960 (college; nude photos of opposite sex); H Abelson et al. 1971; W Griffitt 1973; D Byrne et al. 1974; Senn & Radtke 1990; Mosher & MacIan 1994:108 (college)
No signif. difference						**NORTH AMERICA** *United States*: Quackenbush et al. 1995 (college)
Females more positive						

6.2.8.6. Preference for Quiz/Game Shows on Television

One study of the preferences of school age children regarding television programs found that girls considered quiz and game shows more appealing than did boys (Table 6.2.8.6).

Table 6.2.8.6. Preference for quiz/games shows on television.

Nature of Any Difference	Prepubertal
	Childhood
Males more	
No signif. difference	
Females more	**EUROPE** *Belgium*: K Roe 1998

6.2.8.7. Preference for Romantic Movies and Television Programs

Evidence located concerning sex differences in preferences for movies and television programs focusing on romance have indicated that females enjoy such programs more than males (Table 6.2.8.7).

Table 6.2.8.7. Preference for romantic movies and television programs.

Nature of Any Difference	Prepubertal	Postpubertal
	Childhood	Adolescent
Males more		
No signif. difference		
Females more	**EUROPE** *Several European Countries*: Garitaonandia et al. 2001 (soap operas)	**NORTH AMERICA** *United States*: AM Mitchell 1929; Seagoe 1931; JA Hicks & Hays 1938 (young)

6.2.8.8. Preference for Science/Education Movies and Television Programs

Limited research on preferences for science and education related mass media programs suggest that males enjoy these programs more than do females (Table 6.2.8.8).

Table 6.2.8.8. Preference for science/education movies and television programs.

Nature of Any Difference	Prepubertal	Postpubertal
	Childhood	Adolescent
Males more	**EUROPE** *Belgium*: K Roe 1998 (science and technology)	**NORTH AMERICA** *United States*: S Johnson 1987:27 (science fiction)
No signif. difference		
Females more		

6.2.8.9. Preference for Sports Programs on Television

Table 6.2.8.9 indicates that males have a stronger preference than do girls for watching sports programs on television.

Table 6.2.8.9. Preference for sports programs on television.

Nature of Any Difference	Prepubertal	Postpubertal	
	Childhood	Adolescent	Adult
Males more	**EUROPE** *Belgium*: K Roe 1998; *Multiple European Countries*: Garitaoandia et al. 2001	**NORTH AMERICA** *United States*: DF Roberts 1999	**NORTH AMERICA** *United States*: McCauley 1995:236 (college)
No signif. difference			
Females more			

6.2.8.10. Preference for Talk Shows on Television

One study concluded that females have a stronger preference than males for television talk shows (Table 6.2.8.10).

Table 6.2.8.10. Preference for talk shows on television.

Nature of Any Difference	Prepubertal
	Childhood
Males more	
No signif. difference	
Females more	**EUROPE** *Belgium*: K Roe 1998

6.2.8.11. Preference for Violence in Movies and Television Programs

Studies that examine the tendency to watch violent movies or TV programs rely on interviews and questionnaires. As shown in Table 6.2.8.11, males of all ages seem to prefer violent movies more then do females.

Table 6.2.8.11. Preference for violence in movies and television programs.

Nature of Any Difference	Prepubertal		Postpubertal	
	Early Childhood	Childhood	Adolescent	Adult
Males more	**NORTH AMERICA** *United States*: Comstock 1991 (violent cartoons)	**OCEANIA** *Australia*: Edgar 1977	**NORTH AMERICA** *United States*: AM Mitchell 1929a	**OCEANIA** *Hawaii*: DC Blanchard et al. 1986 (young)
No signif. difference				
Females more				

6.2.8.12. Positive Attitude Toward Computers and the Internet

Surveys in which both sexes have been asked about their interests in computers and the Internet have largely concluded that males have a greater interest than do females, especially regarding the technical aspects of these technologies rather than the day-to-day practical aspects, such as using email and surfing of the Net (Table 6.2.8.12).

Table 6.2.8.12. Positive attitudes toward computers and the internet.

Nature of Any Difference	Prepubertal	Postpubertal		Multiple Age Categories
	Childhood	Adolescent	Adult	
Males prefer more	**EUROPE** *Britain:* Todman & Dick 1993; *Germany*: Turkle 1984* (technical, internal workings) **NORTH AMERICA** *United States*: RD Hess & Miura 1985; Comber et al. 1997*; Brosnan 1998	**EUROPE** *Britain:* Shashaani 1993; T Jones & Clarke 1994; C Comber et al. 1997; A Colley & Comber 2003 (young); *Germany*: Schiermann 1987*; Bannert & Arbinger 1996; *Ital:y* Sensales & Greenfield 1995* (students); *Scotland*: Shashaani 1993*; Durndell et al. 1995; *Yugoslavia*: Kadijevich 2000 **MIDDLE EAST** *Kuwait*: MH Omar 1992* (students) **NORTH AMERICA** *United States*: Hattie & Fitzgerald 1987 (adol); T Levin & Gordon 1989*; NJ Campbell 1990; Sigurdsson 1991 (students); MH Omar 1992* (students); Colley et al. 1994; L Shashaani 1994; Sensales & Greenfield 1995* (students); Funk & Buchman 1996 (computer games); Comber et al. 1997*; Dorman 1998; Kirkpatrick & Cuban 1998; Mumtaz 2001 (computer games)	**EUROPE** *Britain*: L Francis 1994; *Germany*: U Hoffmann 1987* (technical); Schiermann 1987* (technical) **NORTH AMERICA** *United States*: Merchant & Sullivan 1983 (college); Dambrot et al. 1985 (college); Felter 1985; G Wilder et al. 1985; Sproull et al. 1986 (college); Koohang 1987 (college); LD Rosen et al. 1987; T Levin & Gordon 1989* (college); Rosen & Maquire 1990; Shashaani 1993* (young); Whitley 1997; Morahan-Martin 1998; A Wolf 1998; Mitra at el. 2000 (college); P Schumacher & Morahan-Martin 2001	**NORTH AMERICA** *United States*: Giaquinta et al. 1993
No signif. difference	**NORTH AMERICA** *United States*: Collis & Williams 1987	**EUROPE** *Britain*: R Kay 1992 **NORTH AMERICA** *United States*: M Chen 1986; Arthur & Olson 1991; Woodrow 1991; Busch 1995	**NORTH AMERICA** *United States*: Dyck & Smither 1994 (college); TS Parish & Necessary 1996 (college); Todman & Monaghan 1994 (college); SJ Simon 2001 (satisfaction with Internet)	
Females prefer more	**EUROPE** *Germany*: Turkle 1984* (practical) **NORTH AMERICA** *United States*: S Lever et al. 1989; Siann et al. 1990	**NORTH AMERICA** *United States*: Swadener & Jarrett 1987	**EUROPE** *Germany*: U Hoffmann 1987* (practical); Schiermann 1987* (practical) **NORTH AMERICA** *United States*: Gefen & Straub 1997 (opinion of email)	

6.2.9. Toy, Play, Sports, and Hobby Preferences

The many studies of sex differences in toys, play, sports, and hobbies are summarized in the following section.

6.2.9.1. Masculine Play/Toy Preferences in General

It is difficult to be surprised to learn that except in a couple of studies where no significant difference was found, males are more likely than females to prefer masculine toys and forms of play (Table 6.2.9.1). In this regard, masculine is usually defined in terms of the play being more violent and competitively oriented and the toys being more rugged and oriented toward movement and action (Blakemore & Centers 2005:631).

Table 6.2.9.1. Masculine play/toy preferences in general.

Nature of Any Difference	Prepubertal						Multiple Age Categaories
		Toddler	Early Childhood	Childhood			
Males more		**EUROPE** *Sweden*: A Servin et al. 1999* (toy choice) **NORTH AMERICA** *Canada*: Serbin et al. 2001; E Wood et al. 2002; *United States*: H Benjamin 1932; Fein et al. 1975; Blakemore et al. 1979; N Eisenberg-Berg et al. 1979; Langlois & Downs 1980; N Eisenberg et al. 1982; O'Brien & Huston 1985	**EUROPE** *Britain*: PJ Turner et al. 1993 *Sweden*: A Servin et al. 1999* (toy choice, preschool) **NORTH AMERICA** *United States*: LV Harper & Sanders 1975; JM Connor et al. 1977; Bradbard & Parkman 1983; Karpoe & Olney 1983; DG Perry et al. 1984; Bradbard 1985; CC Robinson & Morris 1986; WB Gibson 1985; DB Carter & Levy 1988*; Etaugh & Liss 1992; Lobel & Menashri 1993; Sen 1999	**NORTH AMERICA** *United States*: DeLucia 1963; JG Richardson & Simpson 1982; AC Downs 1983; Martin & Little 1990; CG Rogers et al. 1998; L Ellis et al. 2005			**NORTH AMERICA** *United* States: SA Berenbaum & Snyder 1995
No signif. difference				**NORTH AMERICA** *United States*: Marcus & Overton 1978; DB Carter & Levy 1988			
Females more							

6.2.9.2. Feminine Play/Toy Preferences in General

Feminine toys tend to be relatively soft and usually resemble infants or animals (e.g., dolls and teddy bears). Feminine play has fewer competitive elements, and tends to be quieter and more social and domestic in nature (Blakemore & Centers 2005:631). Unsurprisingly, studies have fairly consistently shown that girls prefer feminine play and toys to a greater extent than boys (Table 6.2.9.2). The exceptions are ones in which no significant differences were found (which were usually studies based on small sample sizes).

Table 6.2.9.2. Feminine play/toy preferences in general.

Nature of Any Difference	Prepubertal						Multiple Age Catagories
		Toddler	Early Childhood	Childhood			
Males more							
No signif. difference		**NORTH AMERICA** *United States*: CL Martin & Little 1990		**EUROPE** *Germany*: Scheifler 1913 **NORTH AMERICA** *United States*: Marcus & Overton 1978; DB Carter & Levy 1988			
Females more		**EUROPE** *Sweden*: A Servin et al. 1999* (toy choice) **NORTH AMERICA** *Canada*: E Wood et al. 2002; *United States*: H Benjamin 1932; Fein et al. 1975; Blakemore et al. 1979; N Eisenberg-Berg et al. 1979*; Langlois & Downs 1980; O'Brien & Huston 1985	**EUROPE** *Sweden*: A Servin et al. 1999* (toy choice, preschool) **NORTH AMERICA** *United States*: JM Connor et al. 1977; N Eisenberg-Berg et al. 1979*; Bradbard & Parkman 1983; Karpoe & Olney 1983; DG Perry et al. 1984; Bradbard 1985; CC Robinson & Morris 1986; WB Gibson 1985	**NORTH AMERICA** *United States*: DeLucia 1963; JG Richardson & Simpson 1982; AC Downs 1983; CG Rogers et al. 1998; L Ellis et al. 2005			**NORTH AMERICA** *United States:* SA Berenbaum & Snyder 1995

6.2.9.3. Sex Typicality in Preferences

According to one study, boys were more likely than girls to choose to play with toys that were typical of their gender than was the case for girls (Table 6.2.9.3).

Table 6.2.9.3. Sex typicality in play and toy preferences.

Nature of Any Difference	Prepubertal
	Early Childhood
Males more	**EUROPE** *Britain*: PJ Turner et al. 1993 (toy choice)
No signif. difference	
Females more	

6.2.9.4. Preference for Play on Climbing Structures

The one available study on gender differences in preferring to play on climbing structures indicated that such a preference was stronger for males than for females (Table 6.2.9.4).

Table 6.2.9.4. Preference for play on climbing structures.

Nature of Any Difference	Prepubertal
	Early Childhood
Males more	**NORTH AMERICA** *United States*: LV Harper & Sanders 1975
No signif. difference	
Females more	

6.2.9.5. Preference for Play Competition and Combat

Studies have repeatedly concluded that males are more likely than females to express a preference for playing competitive and combative games (Table 6.2.9.5).

Table 6.2.9.5. Preference for play competition and combat.

Nature of Any Difference	Prepubertal		Postpubertal
	Early Childhood	Childhood	Adolescent
Males more	**NORTH AMERICA** *United States*: RM Sanders & Harper 1976 (competitive interaction play)	**NORTH AMERICA** *United States*: Lever 1976; Inkpen et al. 1994 (computer/video games); Kafai 1996 (computer/video games); L Ellis et al. 2005 (cops & robbers, old west)	**NORTH AMERICA** *United States*: Lawry et al. 1994 (computer/video games)
No signif. difference			
Females more			

6.2.9.6. Preference for Computer/Video Games With Story Lines and Character Development

Table 6.2.9.6 indicates that the types of video and computer games for which females have a stronger preference than do males are games with story lines and character development.

Table 6.2.9.6. Preference for video/computer games with story lines and character development.

Nature of Any Difference	Prepubertal	Postpubertal
	Childhood	Adolescent
Males more		
No signif. difference		
Females more	**NORTH AMERICA** *United States*: Inkpen et al. 1994; Kafai 1996; Kafai 1998	**NORTH AMERICA** *United States*: Lawry et al. 1994

6.2.9.7. Preferring to Play Computer/Video Games Alone

One study indicated that males prefer playing video/computer games by themselves more than is the case for females (Table 6.2.9.7). In these male-preferred games, a male character typically engages in some form of physical combat or mental competition with one or more evil opponents. Females, in contrast, are more likely to prefer playing video and computer games in collaboration with a female peer in which they control the actions of a female character performing household and dress-up activities.

Table 6.2.9.7. Preferring to play computer/video games alone.

Nature of Any Difference	Prepubertal
	Childhood
Males more	**NORTH AMERICA** *United States*: Inkpen et al. 1994
No signif. difference	
Females more	

6.2.9.8. Preference for Making Crafts/Interest in Artistic Activities

Crafts are usually small objects without moving parts that reflect a substantial aesthetic, rather than a strictly functional, element. As indicated in Table 6.2.9.8, three studies found that females have a stronger preference than males for making crafts.

Table 6.2.9.8. Preference for making crafts/interest in artistic activities.

Nature of Any Difference	Prepubertal		Postpubertal
	Early Childhood	Childhood	Adolescent
Males more			
No signif. difference			
Females more	**NORTH AMERICA** *United States*: LV Harper & Sanders 1975	**NORTH AMERICA** *United States*: Terman et al. 1925 (artistic activities, knitting, & sewing)	**EUROPE** *Britain*: Hamond 1945 (artistic activities)

6.2.9.9. Preference for (Enjoyment of) Dancing

One study concluded that females enjoy dancing more than is the case for males, at least during childhood (Table 6.2.9.9).

Table 6.2.9.9. Preference for (enjoyment of) dancing.

Nature of Any Difference	Prepubertal
	Childhood
Males more	
No signif. difference	
Females more	**NORTH AMERICA** *United States*: Terman et al. 1925

6.2.9.10. Preference for Dolls or Soft/Stuffed Animals as Play Objects

Several studies have documented greater tendencies for females to prefer collecting and playing with dolls or stuffed animals such as teddy bears to a greater degree than males (Table 6.2.9.10).

Table 6.2.9.10. Preference for dolls or soft/stuffed animals as play objects.

Nature of Any Difference	Prepubertal			Postpubertal
	Toddler	Early Childhood	Childhood	Adolescent
Males more				
No signif. difference				
Females more	**EUROPE** *Britain*: A Campbell et al. 2000	**NORTH AMERICA** *United States*: Bach 1945; Rheingold & Cook 1975; Giddings & Halverson 1981	**NORTH AMERICA** *United States*: Terman et al. 1925; Lehman & Witty 1930; Karpoe & Olney 1983; L Ellis et al. 2005	**NORTH AMERICA** *United States*: Basset 1929

6.2.9.11. Preference for Dress-Up Play Activities

Dress-up play either involves dressing oneself or dressing dolls up in fancy, usually adult-like clothing. According to two studies, females prefer playing dress-up more than do males (Table 6.2.9.11).

Table 6.2.9.11. Preference for dress-up play activities.

Nature of Any Difference	Prepubertal		
	Toddler	Early Childhood	Childhood
Males more			
No signif. difference			
Females more	**NORTH AMERICA** *United States*: Jacklin et al. 1973	**NORTH AMERICA** *United States*: Morey 1981b	**NORTH AMERICA** *United States*: Terman et al. 1925; L Ellis et al. 2005

6.2.9.12. Preference for Toys Linked to Homemaking

The two studies cited in Table 6.2.9.12 indicate that girls prefer playing with toys associated with homemaking (e.g., doll houses, cooking utensils) more than do boys.

Table 6.2.9.12. Preference for toys linked to homemaking.

Nature of Any Difference	Prepubertal	
	Toddler	Early Childhood
Males more		
No signif. difference		
Females more	**NORTH AMERICA** *United States*: Jacklin et al. 1973	**NORTH AMERICA** *United States*: Rheingold & Cook 1975

6.2.9.13. Preference for Playing House

The available research indicates that females enjoy playing house as children more than males do (Table 6.2.9.13).

Table 6.2.9.13. Preference for playing house.

Nature of Any Difference	Prepubertal
	Childhood
Males more	
No signif. difference	
Females more	**NORTH AMERICA** *United States*: Terman et al. 1925; Honzik 1951 (older childhood); L Ellis et al. 2005

6.2.9.14. Preference for Hunting and Fishing

Stronger preferences for hunting were expressed by boys rather than by girls in one study in which college students described things they enjoyed doing as children (Table 6.2.9.14).

Table 6.2.9.14. Preference for hunting and fishing.

Nature of Any Difference	Prepubertal
	Childhood
Males more	**NORTH AMERICA** *United States*: Hildreth 1933 (fishing & camping); S Johnson 1987:27 (fishing); L Ellis et al. 2005 (hunting & fishing)
No signif. difference	**AFRICA** *Congo*: Turnbull 1983 (Mbuti Pigmy, net hunting); Sarno 1993 (Pigmy, net hunting); *South Africa*: Hewlett 1991 (San tribe, net hunting)
Females more	

6.2.9.15. Preference for Mechanical and Building Materials as Play Objects

Mechanical objects that often have moving parts, such as toy trucks, and building material, such as that used to construct toy houses, are widely used as objects of play. Table 6.2.9.15 indicates that boys prefer to play with mechanical objects and building materials more than do girls. At least in Western countries, this finding appears across cultures, time, and age groups.

Table 6.2.9.15. Preference for mechanical and building materials as play objects.

Nature of Any Difference	Prepubertal				Postpubertal
	Infant	Toddler	Early Childhood	Childhood	Adolescent
Males more	**NORTH AMERICA** *United States*: Jacklin et al. 1973	**EUROPE** *Sweden*: Servin et al. 1999 **NORTH AMERICA** *United States*: H Benjamin 1932; Vance & McCall 1934	**NORTH AMERICA** *United States*: Farwell 1930; Rheingold & Cook 1975; Giddings & Halverson 1981; Krenzke 1981; Morey 1981b; CC Robinson & Morris 1986; Caldera et al. 1989	**EUROPE** *Germany*: Scheifler 1913 **NORTH AMERICA** *United States*: Terman et al. 1925 (interested in); Lehman & Witty 1930*; Erikson 1951; WD Ward 1968; D Tracy 1987	**NORTH AMERICA** *United States*: Lehman & Witty 1930*
No signif. difference					
Females more					

6.2.9.16. Preference for Play/Activities Outdoors or in Large Spatial Areas

One study indicated that boys prefer to play outside or in larger spatial areas rather than indoors or in confined spaces more than females (Table 6.2.9.16).

Table 6.2.9.16. Preference for play outdoors in large spatial areas.

Nature of Any Difference	Prepubertal	Postpubertal
	Early Childhood	Adolescent
Males more	**NORTH AMERICA** *United States*: LV Harper & Sanders 1975	**NORTH AMERICA** *United States*: JH Coleman 1931
No signif. difference		
Females more		

6.2.9.17. Preference for Playing School

One study suggested that girls had more of a preference for playing school than did boys (Table 6.2.9.7).

Table 6.2.9.17. Preference for playing school.

Nature of Any Difference	Prepubertal
	Childhood
Males more	
No signif. difference	
Females more	**NORTH AMERICA** *United States*: Terman et al. 1925

6.2.9.18. Preference for Playing With Vehicles

According to two studies, males exhibit more interest in playing with vehicles (such as bikes and toy trucks) than is the case for females (Table 6.2.9.18).

Table 6.2.9.18. Preference for playing with vehicles.

Nature of Any Difference	Prepubertal	
	Early Childhood	Childhood
Males more	**ASIA** *Japan*: Oyama & Kido 1939	**NORTH AMERICA** *United States*: Honzik 1951
No signif. difference		
Females more		

6.2.10. Entertainment Preferences and Interests

Below are tables summarizing findings concerning male/female differences in preferences for various types of entertainment.

6.2.10.1. Preference for/Interest in Mechanical Things

A limited amount of evidence suggests that even at an early age, males are more interested in mechanical objects than are females (Table 6.2.10.1).

Table 6.2.10.1. Preference for/interest in mechanical things.

Nature of Any Difference	Prepubertal	Postpubertal
	Infant	Adolescent
Males more	**NORTH AMERICA** *United States*: Stifter & Grant 1993 (inanimate objects with moving parts)	**NORTH AMERICA** *United* States: JH Coleman 1931
No signif. difference		
Females more		

6.2.10.2. Types of Gambling Preferences

Even though males tend to gamble more than do females, a couple of studies have suggested that females who gamble prefer mechanical devises (such as slot machines) more than is the case for males (who express greater preferences for human opponents – such as in most card games) (Table 6.2.10.2).

Table 6.2.10.2. Types of gambling preferences.

Nature of Any Difference	Postpubertal
	Adult
Males more	
No signif. difference	
Females more	**OCEANIA** *Australia*: R Buchanan 1994 (prefer gambling machines rather than personal opponent) **NORTH AMERICA** *United States*: Lesieur & Blume 1991(prefer gambling machines rather than personal opponent)

6.2.10.3. Preference for Music, Art, and Literature

Studies of sex differences in preferences for music, art, and literature have all concluded that females have a stronger preference for these forms of human expression than is true for males (Table 6.2.10.3).

Table 6.2.10.3. Preference for music, art, and literature.

Nature of Any Difference	Prepubertal	Postpubertal	Multiple Age Categories
	Childhood	Adolescent	
Males more			
No signif. difference			
Females more	**NORTH AMERICA** *United States*: Terman 1925 (drawing, music/singing, dramatics, grammar, dancing)	**ASIA** *India*: Grover et al. 2003:17 (young, music); *Japan*: EM Evans et al. 2002; *Taiwan*: EM Evans et al. 2002	**NORTH AMERICA** *United States*: EK Strong 1943

6.2.11. Reading Preferences and Interests

Below are tables summarizing findings having to do with sex differences in the types of material people choose to read.

6.2.11.1. Preference for Reading (Reading for Pleasure)

The choice of reading as a leisure activity is measured through self-reports and diaries. One study noticed that reading characterizes school girls more than it characterizes boys of the same age (Greaney, 1980). Other much earlier studies had not found significant sex differences in reading habits. Relevant references appear in Table 6.2.11.1.

Table 6.2.11.1. Preference for reading (reading for pleasure).

Nature of Any Dif-ference	Prepubertal	Postpubertal
	Childhood	Adolescent
Males more		
No signif. difference	**EUROPE** *Germany*: Scheifler 1913	**NORTH AMERICA** *United States*: Anderson 1912
Females more	**NORTH AMERICA** *United States*: Lehman & Witty 1928; Greaney 1980; RC Anderson 1982	**NORTH AMERICA** *United States*: Terman & Lima 1926 (books); Hildrath 1933

6.2.11.2. Preference/Interest in Fictional Stories When Reading

The limited research on preferences for fiction has concluded that females have a stronger preference than do males (Table 6.2.11.2).

Table 6.2.11.2. Preference/interest in fictional stories when reading.

Nature of Any Difference	Postpubertal
	Adolescent
Males more	
No signif. difference	
Females more	**NORTH AMERICA** *United States*: AM Jordan 1921; Terman & Lima 1926 (emotional fiction)

6.2.11.3. Preference for Stories About Home Life, School, and/or Children

Table 6.2.11.3 indicates that females have a stronger preference for stories about home life, school, or children than is true for males.

Table 6.2.11.3. Preference for stories of home life, school, or children.

Nature of Any Difference	Prepubertal	Adolescent/Adult
	Childhood	Adolescent
Males more		
No signif. difference		
Females more	**NORTH AMERICA** *United States*: Terman & Lima 1926 (gifted); BL Johnson 1932	**NORTH AMERICA** *United States*: Terman & Lima 1926 (home & school); BJ Johnson 1932 (home decorating & living & child care & rearing)

6.2.11.4. Preference for Adventure (and Away From Home) Stories

All of the available research on gender differences in preferences for adventure stories has concluded that males express a stronger preference than do females (Table 6.2.11.4).

Table 6.2.11.4. Preference for adventure (and away from home) stories.

Nature of Any Difference	Prepubertal	Postpubertal
	Childhood	Adolescent
Males more	**NORTH AMERICA** *United States*: Terman & Lima 1926 (gifted); BL Johnson 1932; Thorndike 1941; Norvell 1958	**NORTH AMERICA** *Canada*: DH Russell 1941; *United States*: AM Jordan 1921; Terman & Lima 1926; BJ Johnson 1932; Thorndike & Henry 1940 (young)
No signif. difference		
Females more		

6.2.11.5. Preference for Children's Books

In one study adolescents of both sexes were asked to rate their preferences for various popular children's books. It concluded that females gave these books higher ratings than did males (Table 6.2.11.5).

Table 6.2.11.5. Preference for children's books.

Nature of Any Difference	Postpubertal
	Adolescent
Males more	
No signif. difference	
Females more	**OCEANIA** *Australia*: Ainley et al. 2002:418

6.2.11.6. Preference for Reading Mystery and Romance Material

As Table 6.2.11.6 indicates, females seem to have a stronger interest than males in reading mystery and romance novels.

Table 6.2.11.6. Preference for reading mystery and romance material.

Nature of Any Difference	Prepubertal	Postpubertal
	Childhood	Adolescent
Males more		
No signif. difference		
Females more	**NORTH AMERICA** *United States*: Thorndike 1941; Norvell 1958	**NORTH AMERICA** *United States*: Thorndike & Henry 1940 (young)

6.2.11.7. Preference for Reading Material Related to Science

The available evidence suggests that males have a greater interest than females in science-related reading material (Table 6.2.11.7).

Table 6.2.11.7. Preference for reading material related to science.

Nature of Any Difference	Prepubertal
	Childhood
Males more	**NORTH AMERICA** *United States*: BL Johnson 1932 (in newspaper & magazine articles); Thorndike 1941; Norvell 1958; S Johnson 1987:27 (science fiction)
No signif. difference	
Females more	

6.2.11.8. Preference for Reading Material Related to Sports

As shown in Table 6.2.11.8, males have been shown to prefer reading material that is related to sports more than females do.

Table 6.2.11.8. Preference for reading material related to sports.

Nature of Any Difference	Prepubertal	Postpubertal
	Childhood	Adolescent
Males more	**NORTH AMERICA** *United States*: Thorndike 1941; Norvell 1958	**NORTH AMERICA** *United States*: BL Johnson 1932 (in newspaper & magazine articles); Thorndike & Henry 1940 (young, sport stories)
No signif. difference		
Females more		

6.2.11.9. Preference for Reading Newspapers/Magazines

Sex differences in preferences for reading newspapers and magazines appeared to at least partly depend on the subject matter of the particular articles (Table 6.2.11.9).

Table 6.2.11.9. Preference for reading newspapers/magazines.

Nature of Any Difference	Adolescent/Adult
	Adolescent
Males more	**NORTH AMERICA** *United States*: BL Johnson 1932* (crime news, national affairs); EA Adams 1936
No signif. difference	
Females more	**NORTH AMERICA** *United States*: BJ Johnson 1932* (society news)

6.2.11.10. Preference for Readings on Self-Improvement

One study concluded that females had a greater interest than males in reading material dealing with self-improvement (Table 6.2.11.10).

Table 6.2.11.10. Preference for readings on self-improvement.

Nature of Any Difference	Adolescent/Adult
	Adolescent
Males more	
No signif. difference	
Females more	**NORTH AMERICA** *United States*: Thorndike & Henry 1940 (young)

6.2.11.11. Preference for Reading Stories of War/War Stories

The one located study of sex differences in preferring to read stories about war concluded that male preferences surpassed those of females (Table 6.2.11.11).

Table 6.2.11.11. Preference for reading stories of war/war stories.

Nature of Any Difference				Adolescent/Adult	
				Adolescent	
Males more				**NORTH AMERICA** *United States*: Thorndike & Henry 1940 (young)	
No signif. difference					
Females more					

6.2.12. Work-Related Preferences and Interests

Sex differences in preferences and interests surrounding work are reviewed in the following section.

6.2.12.1. Preference for Gender-Typical Occupations

According to nearly all studies, males express stronger gender-typical occupational preferences than do females (Table 6.2.12.1). In other words, males are more likely than females to express interests in jobs that are typically performed predominantly by their own sex.

Table 6.2.12.1. Preference for gender-typical occupations.

Nature of Any Difference	Prepubertal				Postpubertal		
		Toddler	Early Childhood	Childhood	Adolescent	Adult	
Males more		**NORTH AMERICA** *United States*: Marini & Greenberger 1978; Marini & Brinton 1984	**NORTH AMERICA** *United States*: Papalia & Tennent 1975; O'Bryant & Corder-Bolz 1978	**AFRICA** *South Africa*: J Cook & Simbayi 1998 (Whites) **NORTH AMERICA** *United States*: WO Shepard & Hess 1975*; Sheresky 1976; Knell & Winer 1979*; Hageman & Gladding 1983; CJ Archer 1984; Alpert & Breen 1989*	**NORTH AMERICA** *United States*: WO Shepard & Hess 1975*; Knell & Winer 1979*; Alpert & Breen 1989*	**ASIA** *India*: Kulik 2001:159 (young) **NORTH AMERICA** *United States*: Werts 1966 (college); Watley 1969 (college); Angrist & Almquist 1975	
No signif. difference							
Females more						**OCEANIA** *Australia*: Bodna & Schwarz 1983:59 (young)	

6.2.12.2. Interest in Jobs With Mechanical and Science/Math Oriented Activities

The available research has found males expressing a greater interest than females in jobs that have a mechanical or science or math orientation (Table 6.2.12.2).

Table 6.2.12.2. Interest in jobs with mechanical and science/math oriented activities.

Nature of Any Difference				Postpubertal		
				Adolescent	Adult	
Males more				**NORTH AMERICA** *United States*: V O'Brien et al. 1999	**NORTH AMERICA** *United States*: Hackett & Campbell 1987	
No signif. difference						
Females more						

6.2.12.3. Variability in Occupational Interests

Studies that have asked subjects to rate the extent to which they would be interested in a wide variety of occupations have all concluded that males express interest in a greater variety of occupations than is the case for females (Table 6.2.12.3).

Table 6.2.12.3. Variability in occupational interests.

Nature of Any Difference	Prepubertal			Postpubertal		
			Early Childhood		Adolescent	Adult
Males more			**NORTH AMERICA** *United States*: Papalia & Tennent 1975		**NORTH AMERICA** *United States*: M Rosenberg 1957; Sewell & Orenstein 1964; Douvan & Adelson 1966; H Oliver 1973; Marini & Greenberger 1978b	**NORTH AMERICA** *United States*: Werts 1966 (college)
No signif. difference						
Females more						

6.2.12.4. Interest in Task Mastery

Men appear to be more task-oriented than women in the sense that they focus in on tasks of interest until they have mastered the task. The evidence consistent with this conclusion is presented in Table 6.2.12.4.

Table 6.2.12.4. Interest in task mastery.

Nature of Any Difference	Prepubertal				Postpubertal		Multiple Age Categories
				Childhood		Adult	
Males more				**NORTH AMERICA** *United States*: MN Libby & Aries 1989; VC Crandall 1964		**NORTH AMERICA** *United States*: French & Lesseer 1964 (young); LN Hoffman 1975; Spence & Helmreich 1978 (college); DE Olds & Shaver 1980 (young)	**ASIA** *Japan*: Yamauchi et al. 1994* ("mastery" of work tasks) **NORTH AMERICA** *United States*: Aries & Johnson 1983
No signif. difference							**EUROPE** *Ireland*: Yamauchi et al. 1994* ("mastery" of work tasks)
Females more							

6.2.12.5. Preference for Jobs That Involve Working With Children

One study compared adults of both sexes regarding their interests in jobs that involved working closely with children. It concluded that women expressed a stronger preference for these jobs than did men (Table 6.2.12.5).

Table 6.2.12.5. Preference for jobs that involve working with children.

Nature of Any Difference					Postpubertal	
						Adult
Males more						
No signif. difference						
Females more						**NORTH AMERICA** *United States*: Douvan & Adelson 1966:37

6.2.12.6. Preference for Working Independently (Rather Than Collaboratively)

According to Table 6.2.12.6, males have a stronger preference for being able to work independently than do females.

Table 6.2.12.6. Preference for working independently (rather than collaboratively).

Nature of Any Dif-ference					Postpubertal		Multiple Age Categories
				Childhood		Adult	
Males more				**NORTH AMERICA** *United States*: Leong & Tata 1990 (Chinese Americans)		**NORTH AMERICA** *Canada*: S Martin 1998 (young); *United States*: Selby & Ryba 1994 (young); Corston & Colman 1996 (young)	**NORTH AMERICA** *United States*: Centers & Bugenthal 1966
No signif. difference							
Females more							

6.2.12.7. Preference Regarding Career Advancement/Aspirations

Limited research suggests that males have more of a preference for the prospects of career advancement than females do when they consider jobs (Table 6.2.12.7).

Table 6.2.12.7. Preference regarding career advancement/aspirations.

Nature of Any Difference					Postpubertal	
					Adolescent	Adult
Males more					**NORTH AMERICA** *United States*: Leung et al. 1994 (high school students)	**NORTH AMERICA** *United States*: Beutell & Brenner 1986 (college, business majors)
No signif. difference						
Females more						

6.2.12.8. Preference Regarding Competitiveness Aspects of Job

Males appear to have a greater preference for jobs with competitive features than do females (Table 6.2.12.8)

Table 6.2.12.8. Preference regarding competitiveness as an aspect of job.

Nature of Any Difference					Postpubertal	
						Adult
Males more						**EUROPE** *Germany*: Kirkcaldy et al. 1992 (young) **NORTH AMERICA** *Canada*: Wahn 2003; *United States*: Wiersma 1990 (young)
No signif. difference						
Females more						

6.2.12.9. Preference for Hierarchical Social Organizations

The one located study found that males expressed a greater preference for hierarchical social relationships in organizations than do females (Table 6.2.12.9).

Table 6.2.12.9. Preference for hierarchical social organizations.

Nature of Any Difference					Postpubertal	
						Adult
Males more						**NORTH AMERICA** *United States*: Pratto et al. 1997
No signif. difference						
Females more						

6.2.12.10. Preference Regarding Flexible Work Hours

Several studies have concluded that in selecting their jobs, women value flexible work hours more than do males (Table 6.2.12.10).

Table 6.2.12.10. Preference regarding flexible work hours.

Nature of Any Difference					Postpubertal	
						Adult
Males more						
No signif. difference						
Females more						**NORTH AMERICA** *United States*: CF Epstein 1981 (lawyers); RL Able 1989 (lawyers); DL Chambers 1989 (lawyers); LA Jackson et al. 1992 (college); Redman et al. 1994 (medical students); Honeycutt & Rosen 1997 **INTERNATIONAL** *Multiple Countries*: Browne 1997

6.2.12.11. Preference Regarding Frequent Feedback in One's Job

Most of the available studies surrounding gender differences in the extent to which men and women like to have frequent feedback as to how well they are performing their jobs have indicated that women value this more than do males (Table 6.2.12.11).

Table 6.2.12.11. Preference regarding frequent feedback in one's job.

Nature of Any Difference					Postpubertal	
						Adult
Males more						
No signif. difference						**NORTH AMERICA** *United States*: B Major & Konar 1984 (college, business major)
Females more						**NORTH AMERICA** *United States*: Beutell & Brenner 1986 (college, business major); BA Martin 1989 (college, business major) **INTERNATIONAL** *Multiple Countries*: Browne 1997

6.2.12.12. Preference Regarding Friendly Work Atmosphere

The importance of having a friendly work atmosphere appears to be nearly equal for both males and females, but when there is a significant difference, females consider this feature of work to be more important than do males (Table 6.2.12.12).

Table 6.2.12.12. Preference for friendly work atmosphere.

Nature of Any Difference					Postpubertal	
					Adolescent	Adult
Males more						
No signif. difference						**NORTH AMERICA** *United States*: B Major & Konar 1984; Thacker 1995 **INTERNATIONAL** *Multiple Countries*: Browne 1997
Females more					**NORTH AMERICA** *United States*: Marini et al. 1996	**NORTH AMERICA** *United States*: Beutell & Brenner 1986 (college, business majors); LA Jackson et al. 1992 (college); BA Martin 1989 (college, business majors)

6.2.12.13. Preference for Having Important/Significant Work Responsibilities

Most, but not all, studies of how important it is to have a job with responsibility for important and significant work have suggested that women value this more than do males (Table 6.2.12.13).

Table 6.2.12.13. Preference for having important/significant work responsibilities.

Nature of Any Difference					Postpubertal	
					Adolescent	Adult
Males more					**NORTH AMERICA** *United States:* Miner 1922 (high responsibility)	
No signif. difference						
Females more					**NORTH AMERICA** *Canada*: Lupart et al. 2004:34	**NORTH AMERICA** *United States*: Wheeler 1981; Mottaz 1986; AM Konrad & Langton 1991 (MBA students)

6.2.12.14. Preference Regarding "Interesting" Work When Choosing a Job

In most studies, adult females place a higher priority on "interesting work" as criteria in choosing jobs than do adult males (Table 6.2.12.14).

Table 6.2.12.14. Preference regarding "interesting" work when choosing a job.

Nature of Any Difference					Postpubertal	
					Adolescent	Adult
Males more						
No signif. difference						**INTERNATIONAL** *Multiple Countries*: Browne 1997
Females more					**NORTH AMERICA** *United States*: Marini et al. 1996	**NORTH AMERICA** *United States*: B Major and Konar 1984; Beutell & Brenner 1986 (college, business majors); BA Martin 1989; Thacker 1995; Todisco et al. 1995 (college, medical students)

6.2.12.15. Preferences Regarding Job Autonomy

A few studies have failed to find significant sex differences in the importance placed on job autonomy in rating features of jobs that individuals would consider desirable (Table 6.2.12.15).

Table 6.2.12.15. Preference regarding job autonomy.

Nature of Any Dif-ference					Postpubertal
					Adult
Males more					
No signif. difference					**NORTH AMERICA** *United States*: BM Major & Konar 1984 (college business major); BA Martin 1989 (college, business major)
Females more					

6.2.12.16. Preference Regarding Job Pleasantness/Comfort/Cleanliness

The pleasantness/comfort/cleanliness of a job has to do with avoiding work that is dirty, smelly, or physically demanding. The available evidence suggests that females consider this to be a more important criterion in choosing a job than do males (Table 6.2.12.16).

Table 6.2.12.16. Preference regarding job pleasantness/comfort/cleanliness.

Nature of Any Difference					Postpubertal	Multiple Age Categories
					Adult	
Males more						
No signif. difference						
Females more					**NORTH AMERICA** *United States*: Beutell & Brenner 1986 (college, business majors)	**NORTH AMERICA** *United States*: VE Schein 1973; VE Schein et al. 1989

6.2.12.17. Preference Regarding Job Security

Most studies have failed to find a discernable sex difference in terms of the importance placed on job security as a consideration in choosing a job or occupation (Table 6.2.12.17).

Table 6.2.12.17. Preference regarding job security.

Nature of Any Difference				Postpubertal		Multiple Age Categories
				Adolescent	Adult	
Males more					**NORTH AMERICA** *United States*: Beutell & Brenner 1986 (college, business majors); Todisco et al. 1995 (college)	
No signif. difference				**NORTH AMERICA** *United States*: Marini et al. 1996;	**NORTH AMERICA** *United States*: B Major & Konar 1984 (college, business major); B Martin 1989 (college, business majors)	
Females more						**NORTH AMERICA** *United States*: Chusmir & Parker 1991

6.2.12.18. Preference Regarding Monetary Compensation of Jobs (Importance of Money in One's Job)

Several studies have failed to find a significant sex difference in terms of the importance placed on the monetary compensation involved in whatever job one chooses. However, all studies that have found a significant difference have concluded that males consider such compensation more important than do females (Table 6.2.12.18).

Table 6.2.12.18. Preference regarding monetary compensation of jobs (importance of money in one's job).

Nature of Any Difference					Postpubertal		Multiple Age Categories
					Adolescent	Adult	
Males more					**ASIA** *India*: Kanungo 1960; B Mannheim 1988; B Mannheim & Seger 1993:283 **NORTH AMERICA** *Canada*: Lupart et al. 2004:34; *United States*: Miner 1922; SL Singer & Steffere 1954; Gribbones & Lohnes 1965; Wijting et al. 1978; Lueptow 1980; Peng et al. 1981; Herzog 1982; Herzog & Bachman 1982; Fiorentine 1988b:149; Erez et al. 1989; Dick & Rallis 1991; Marini et al. 1996	**EUROPE** *Germany*: Kirkcaldy et al. 1992 (young) **NORTH AMERICA** *United States*: Manhardt 1972 (college business majors); KM Bartol 1976* (college); Andrisani 1978; OC Brenner & Tomkiewicz 1979:745 (college business majors); Wheeler 1981; B Major & Konar 1984; P Lindsay & Knox 1984 (young); Beutell & Brenner 1986:39 (college, business majors); Mottaz 1986; Bridges 1989 (young); Thiessen & Ross 1990:301 (college); Wiersma 1990 (young); AM Konrad & Langton 1991 (MBA students); Eccles 1994 (college); Zeff et al. 1994:761 (young)	**NORTH AMERICA** *United States*: Brief & Aldage 1975 (Blacks); Schuler 1975; KM Bartol 1976*; Ehrenreich 1983; M Betz & O'Connell 1989; Chusmir & Parker 1991; Beutel & Marini 1995
No signif. difference						**INTERNATIONAL** *Multiple Countries*: Browne 1997 **NORTH AMERICA** *United States*: F Crosby 1982; Walker et al. 1982 (young); Golding et al. 1983; CT Harris & Earle 1986; BA Martin 1989 (college, business major); Redman et al. 1994 (medical students); Thacker 1995; Honeycutt & Rosen 1997 (college business major)	**NORTH AMERICA** *United States*: JE Walker et al. 1982*; R Rowe & Snizek 1995:225
Females more						**MIDDLE EAST** *Israel*: Kulik 2001:159 (young, reject a job because of low wages)	

6.2.12.19. Preference Regarding People-Oriented Jobs

Numerous studies have shown that females prefer jobs that involve considerable interactions with people to a greater degree than do males (Table 6.2.12.19). This conclusion has been reached by other literature reviews of the topic (England et al. 1982; Hochschild 1983).

Table 6.2.12.19. Preference regarding people-oriented jobs.

Nature of Any Difference	Prepubertal				Postpubertal		Multiple Age Categories
				Childhood	Adolescent	Adult	
Males more							
No signif. difference				**NORTH AMERICA** *United States*: Engelhard & Monsaas 1989* (late school age)			
Females more				**NORTH AMERICA** *United States*: Ahlgren & Johnson 1979*; Engelhard & Monsaas 1989* (young school age); Helwig 2002*	**NORTH AMERICA** *United States*: Miner 1922; Ahlgren & Johnson 1979*; Lueptow 1980; C Johnson & Engelhard 1992 (Blacks); Helwig 2002*	**EUROPE** *Germany*: Kirkcaldy et al. 1992 (young) **NORTH AMERICA** *United States*: Beutell & Brenner 1986 (college, business majors); Holvey et al. 1986:52 (disabled, young); DL Blustein 1988 (young); Betz & O'Connell 1989* (pharmacy students); Wiersma 1990 (young)	**NORTH AMERICA** *United States*: Centers & Bugenthal 1966; Brief & Aldage 1975; KM Bartol 1976; HS Farmer 1985; Mottaz 1986; M Betz & O'Connell 1989*

6.2.12.20. Preference Regarding Risk-Taking Aspects of Jobs

Research has indicated that males have a greater preference than do females for jobs that involve a substantial element of risk (Table 6.2.12.20).

Table 6.2.12.20. Preference regarding risk-taking aspects of jobs.

Nature of Any Difference	Prepubertal				Postpubertal		
				Childhood	Adolescent	Adult	
Males more				**NORTH AMERICA** *United States*: Tryon 1935*	**NORTH AMERICA** *United States*: Tryon 1935*	**NORTH AMERICA** *United States*: OC Brenner & Tomkiewicz 1979:745 (college business majors); JE Walker et al. 1982 (young); Subich et al. 1989 (young); Beutell & Brenner 1986 (college business majors, physical risk)	
No signif. difference							
Females more							

6.2.12.21. Preference Regarding Supervisory/High Prestige/Power-Oriented Jobs

The available research is very inconsistent regarding any gender differences in the importance placed on one's chosen job involving high prestige or power or supervisory responsibilities (Table 6.2.12.21).

Table 6.2.12.21. Preference regarding supervisory/high prestige/power-oriented jobs.

Nature of Any Dif-ference	Postpubertal	
	Adolescent	Adult
Males more	**ASIA** *India*: Kanungo 1960 **NORTH AMERICA** *Canada*: Lupart et al. 2004:34; *United States*: Miner 1922 (giving directions); SL Singer & Steffere 1954; F Harrison 1969; Otto et al. 1974; Lueptow 1980; Leuptow 1980 (important element in job choice); Fiorentine 1988:150 (administrative responsibilities an important criteria)	**NORTH AMERICA** *United States*: J Bernard 1964 (college professors); Wiersma 1990 (young); JA Jacobs 1993; Eccles 1994 (college)
No signif. difference		**NORTH AMERICA** *United States*: B Major & Konar 1984 (college, business majors); BA Martin 1989 (college, business majors); Thacker 1995; Todisco et al. 1995 (college)
Females more	**NORTH AMERICA** *United States*: H Oliver 1973; Hout & Morgan 1975; Marini et al. 1996	**NORTH AMERICA** *United States*: Beutell & Brenner 1986 (college, business majors)

6.2.12.22. Changes in Status Aspirations With Age

One study concluded that as adolescents aged, males increased their aspirations for high status jobs more than did females (Table 6.2.12.22).

Table 6.2.12.22. Changes in status aspirations with age.

Nature of Any Dif-ference	Postpubertal
	Adolescent
Males more	**NORTH AMERICA** *United States*: P Cutright 1960 (during high school)
No signif. difference	
Females more	

6.2.13. Specific Career/Occupational Preferences/Interests

Research findings pertaining to gender differences in the types of careers and occupations people desire are reviewed in the following subsection.

6.2.13.1. Interest in Being an Accountant/Financial Officer

No consistent sex difference has been found regarding interest in the field of accounting (Table 6.2.13.1).

Table 6.2.13.1. Interest in being an accountant/financial officer.

Nature of Any Dif-ference	Postpubertal
	Adolescent
Males more	**NORTH AMERICA** *Canada*: Lupart et al. 2004:37
No signif. difference	**NORTH AMERICA** *United States*: Fiorentine 1988b:153
Females more	**NORTH AMERICA** *United States*: HD Carter & Strong 1933 (certified public accountant, twins)

6.2.13.2. Interest in Being an Actor/Actress/Entertainer

Two studies of interest in becoming an actor/actress or entertainer both concluded that this appealed to females more than to males (Table 6.2.13.2).

Table 6.2.13.2. Interest in being an actor/actress/entertainer.

Nature of Any Dif-ference	Postpubertal
	Adolescent
Males more	
No signif. difference	
Females more	**NORTH AMERICA** *Canada*: Lupart et al. 2004:37; *United States*: Miner 1922 (entertainment)

6.2.13.3. Interest in Being an Architect

Table 6.2.13.3 indicates that greater proportions of males have an interest in becoming an architect than do females.

Table 6.2.13.3. Interest in being an architect.

Nature of Any Difference	Postpubertal
	Adolescent
Males more	**NORTH AMERICA** *Canada*: Lupart et al. 2004:37; *United States*: Fiorentine 1988b:153
No signif. difference	
Females more	

6.2.13.4. Interest in Being an Artist

One study found that females exhibited a greater interest in becoming artists than did males (Table 6.2.13.4).

Table 6.2.13.4. Interest in being an artist.

Nature of Any Difference	Postpubertal
	Adolescent
Males more	
No signif. difference	
Females more	**NORTH AMERICA** *Canada*: Lupart et al. 2004:37

6.2.13.5. Interest in Being an Athlete

More males than females expressed a desire to become athletes as their adult occupation (Table 6.2.13.5).

Table 6.2.13.5. Interest in being an athlete.

Nature of Any Difference	Postpubertal
	Adolescent
Males more	**EUROPE** *Britain*: Holt & Morley 2004 (young)
No signif. difference	
Females more	

6.2.13.6. Interest in Being a Business Executive

No sex difference was found in one study with regard to interests in becoming some type of business executive (Table 6.2.13.6).

Table 6.2.13.6. Interest in being a business executive.

Nature of Any Difference	Postpubertal
	Adolescent
Males more	
No signif. difference	**NORTH AMERICA** *United States*: Williamson & Darley 1935:366
Females more	

6.2.13.7. Interest in Being a Clerk/Record Keeper

Greater proportions of females than males expressed an interest in being clerks and record keepers (Table 6.2.13.7).

Table 6.2.13.7. Interest in being a clerk/record keeper.

Nature of Any Difference	Postpubertal
	Adolescent
Males more	
No signif. difference	
Females more	**NORTH AMERICA** *United States*: Miner 1922; RS Powers & Wojtkiewicz 2004:610

6.2.13.8. Interest in Being a College Professor

One study that compared the sexes with respect to their having an interest in being a college professor found more males expressing such an interest in 1969, but that there was no significant sex difference a little more than a decade later (Table 6.2.13.8).

Table 6.2.13.8. Interest in being a college professor.

Nature of Any Difference				Postpubertal		
				Adolescent		
Males more				**NORTH AMERICA** *United States*: Fiorentine 1988b:153* (in 1969)		
No signif. difference				**NORTH AMERICA** *United States*: Fiorentine 1988b:153* (in 1984)		
Females more						

6.2.13.9. Interest in Being a Computer Engineer

According to one study, more males than females expressed an interest in becoming a computer engineer (Table 6.2.13.9).

Table 6.2.13.9. Interest in being a computer engineer.

Nature of Any Difference				Postpubertal		
				Adolescent		
Males more				**NORTH AMERICA** *Canada*: Lupart et al. 2004:37		
No signif. difference						
Females more						

6.2.13.10. Interest in Being a Construction Worker

In one study, males expressed more interest in doing construction work than did females (Table 6.2.13.10).

Table 6.2.13.10. Interest in being a construction worker.

Nature of Any Difference				Postpubertal		
				Adolescent		
Males more				**NORTH AMERICA** *United States*: Miner 1922		
No signif. difference						
Females more						

6.2.13.11 Interest in Being an Engineer

Research surrounding interest in the profession of engineering has all concluded that such interest is greater in males than in females (Table 6.2.13.11).

Table 6.2.13.11. Interest in being an engineer.

Nature of Any Difference				Postpubertal		
				Adolescent		
Males more				**EUROPE** *Britain*: A Kelly 1989 **NORTH AMERICA** *United States*: HD Carter & Strong 1933 (twins); Williamson & Darley 1935:366; Looft 1971; Fiorentine 1988b:153		
No signif. difference						
Females more						

6.2.13.12 Interest in Farming

One study of interests in farming concluded that it was stronger in males than in females (Table 6.2.13.12).

Table 6.2.13.12. Interest in farming.

Nature of Any Difference	Postpubertal
	Adolescent
Males more	**NORTH AMERICA** *United States*: HD Carter & Strong 1933 (twins)
No signif. difference	
Females more	

6.2.13.13. Interest in Being a Hairdresser

The one available study of sex differences in a person's interest in being a hairdresser concluded that it was greater for females than for males (Table 6.2.13.13).

Table 6.2.13.13. Interest in being a hairdresser.

Nature of Any Difference	Postpubertal
	Adolescent
Males more	
No signif. difference	
Females more	**EUROPE** *Britain*: A Kelly 1989

6.2.13.14. Interest in Being a Homemaker

In one study, females were found to express more interest in being a homemaker (housewife/househusband) than was true for males (Table 6.2.13.14).

Table 6.2.13.14. Interest in being a homemaker.

Nature of Any Difference	Postpubertal
	Adolescent
Males more	
No signif. difference	
Females more	**NORTH AMERICA** *United States*: RS Powers & Wojtkiewicz 2004:610

6.2.13.15. Interest in Being an Interior or Landscape Designer

Interior decorating and landscaping were more attractive as professions to females than to males, according to one study (Table 6.2.13.15).

Table 6.2.13.15. Interest in being an interior or landscape designer.

Nature of Any Difference	Postpubertal
	Adolescent
Males more	
No signif. difference	
Females more	**NORTH AMERICA** *Canada*: Lupart et al. 2004:37

6.2.13.16. Interest in Journalism/Being a Journalist

The occupation of journalism was more appealing to females than to males, according to the one available study (Table 6.2.13.16).

Table 6.2.13.16. Interest in journalism/being an journalist.

Nature of Any Difference	Postpubertal
	Adolescent
Males more	
No signif. difference	
Females more	**NORTH AMERICA** *United States*: HD Carter & Strong 1933 (twins)

6.2.13.17. Interest in Being a Lawyer

Most of the available research on sex differences in becoming a lawyer has concluded that doing so appeals to males more than it does to females (Table 6.2.13.17).

Table 6.2.13.17. Interest in being a lawyer.

Nature of Any Difference				Postpubertal	
				Adolescent	
Males more				**NORTH AMERICA** *Canada*: Lupart et al. 2004:37; *United States*: Williamson & Darley 1935:366; Fiorentine 1988b:153* (in 1969)	
No signif. difference				**NORTH AMERICA** *United States*: Fiorentine 1988b:153* (in 1984)	
Females more					

6.2.13.18. Interest in Being a Librarian

One study concluded that females were more interested in becoming librarians than was the case for males (Table 6.2.13.18).

Table 6.2.13.18. Interest in being a librarian.

Nature of Any Difference				Postpubertal	
				Adolescent	
Males more					
No signif. difference					
Females more				**NORTH AMERICA** *United States*: Williamson & Darley 1935:366	

6.2.13.19. Interest in Being a Life Insurance Agent

The occupation of a life insurance agent was found to be more appealing to females than to males in the one available study (Table 6.2.13.19).

Table 6.2.13.19. Interest in being a life insurance agent.

Nature of Any Difference				Postpubertal	
				Adolescent	
Males more					
No signif. difference					
Females more				**NORTH AMERICA** *United States*: HD Carter & Strong 1933 (twins)	

6.2.13.20. Interest in Being a Machine Operator

More males than females were found to express an interest in becoming a machine operator (Table 6.2.13.20).

Table 6.2.13.20. Interest in being a machine operator.

Nature of Any Difference				Postpubertal	
				Adolescent	
Males more				**NORTH AMERICA** *United States*: Miner 1922	
No signif. difference					
Females more					

6.2.13.21. Interest in Being a Mathematician

The one available study concluded that more males than females had an interest in becoming mathematicians (Table 6.2.13.21).

Table 6.2.13.21. Interest in being a mathematician.

Nature of Any Difference				Postpubertal	
				Adolescent	
Males more				**NORTH AMERICA** *United States*: HD Carter & Strong 1933 (twins)	
No signif. difference					
Females more					

6.2.13.22. Interest in Being a Mechanic

Interest in being a mechanic has been shown to be greater on average among males than among females (Table 6.2.13.22).

Table 6.2.13.22. Interest in being a mechanic.

Nature of Any Difference				Postpubertal	
				Adolescent	
Males more				**NORTH AMERICA** *United States*: Miner 1922 (machine operator); Kuder 1946 (mechanic); RS Powers & Wojtkiewicz 2004:610	
No signif. difference					
Females more					

6.2.13.23. Interest in Being a Musician

Becoming a musician was found in one study to be more appealing to females than to males (Table 6.2.13.23).

Table 6.2.13.23. Interest in being a musician.

Nature of Any Difference				Postpubertal	
				Adolescent	
Males more					
No signif. difference					
Females more				**NORTH AMERICA** *Canada*: Lupart et al. 2004:37	

6.2.13.24. Interest in Being a Nurse

The only study located on interest in becoming a nurse concluded that this interest was greater for females than for males (Table 6.2.13.24).

Table 6.2.13.24. Interest in being a nurse.

Nature of Any Difference				Postpubertal	
				Adolescent	
Males more					
No signif. difference					
Females more				**EUROPE** *Britain*: A Kelly 1989	

6.2.13.25. Interest in Being a Physician

Most of the studies of adolescent interest in becoming physicians concluded that this was greater for males than for females (Table 6.2.13.25).

Table 6.2.13.25. Interest in being a physician.

Nature of Any Difference				Postpubertal	
				Adolescent	
Males more				**NORTH AMERICA** *United States*: HD Carter & Strong 1933 (twins); Williamson & Darley 1935:366; Fiorentine 1988b:153* (in 1969)	
No signif. difference				**NORTH AMERICA** *United States*: Fiorentine 1988b:153* (in 1984)	
Females more					

6.2.13.26. Interest in Aviation/Being a Pilot

A couple of studies have found that males express more interest in aviation (or in becoming a pilot) than is true for females (Table 6.2.13.26).

Table 6.2.13.26. Interest in aviation/being a pilot.

Nature of Any Difference				Postpubertal		
				Adolescent		
Males more				**EUROPE** *Britain*: A Kelly 1989 **NORTH AMERICA** *United States*: Williamson & Darley 1935:366 (aviation)		
No signif. difference						
Females more						

6.2.13.27. Interest in Being a Scientist

The majority of studies surrounding gender differences in becoming scientists have concluded that male interest surpasses that of females, although one study following these interests over two time frames concluded that no significant sex difference existed in the latter time period (Table 6.2.13.27).

Table 6.2.13.27. Interest in being a scientist.

Nature of Any Difference				Postpubertal		
				Adolescent		
Males more				**NORTH AMERICA** *Canada*: Lupart et al. 2004:37; *United States*: Miner 1922; HD Carter & Strong 1933* (chemist, physicists, twins); Williamson & Darley 1935:366; Looft 1971; Fiorentine 1988b:153* (in 1969)		
No signif. difference				**NORTH AMERICA** *United States*: Fiorentine 1988b:153* (in 1984)		
Females more						

6.2.13.28. Interest in Being a School Superintendent

One study of people's interests in becoming school superintendents concluded that such interest was greater for females than for males (Table 6.2.13.28).

Table 6.2.13.28. Interest in being an school superintendent.

Nature of Any Difference				Postpubertal		
				Adolescent		
Males more						
No signif. difference						
Females more				**NORTH AMERICA** *United States*: HD Carter & Strong 1933 (twins)		

6.2.13.29. Interest in Being a Stockbroker

In one study, more males than females expressed interest in becoming stockbrokers (Table 6.2.13.29).

Table 6.2.13.29. Interest in being a stockbroker.

Nature of Any Difference				Postpubertal		
				Adolescent		
Males more				**NORTH AMERICA** *Canada*: Lupart et al. 2004:37		
No signif. difference						
Females more						

6.2.13.30. Interest in Being a Teacher

All of the available research has concluded that females have a stronger interest than males in becoming teachers (Table 6.2.13.30).

Table 6.2.13.30. Interest in being a teacher.

Nature of Any Difference				Postpubertal		
				Adolescent		
Males more						
No signif. difference						
Females more				**EUROPE** *Britain*: A Kelly 1989 **NORTH AMERICA** *United States*: Miner 1922; Williamson & Darley 1935:366		

6.2.13.31. Interest in Being a Social Worker/Welfare Worker

One study concluded that social work was more appealing to females than to males (Table 6.2.13.31).

Table 6.2.13.31. Interest in being a social worker/welfare worker.

Nature of Any Difference	Postpubertal
	Adolescent
Males more	
No signif. difference	
Females more	**NORTH AMERICA** *United States*: Miner 1922

6.2.14. Importance/Centrality of One's Job to Overall Life

The available research on the importance of work and one's occupation to an individual's overall life is reviewed below.

6.2.14.1. Work Ethic/Work Motivation

Work ethic refers to the degree of commitment that one has toward engaging in productive labor. (This phenomenon has sometimes been referred to as the so-called *Protestant Work Ethic*, although the implication that it is stronger among Protestants than among other religious groups is questionable.) Most studies have not found significant gender differences, although a few suggest that females have a stronger work ethic than males (Table 6.2.14.1).

Table 6.2.14.1. Work ethic/work motivation.

Nature of Any Difference	Multiple Age Categories
Males more	
No signif. difference	**ASIA** *Japan*: Yamauchi et al. 1994:197* **EUROPE** *Britain*: Furnham 1984; *Ireland*: Yamauchi et al. 1994:197* **NORTH AMERICA** *United States*: Mirels & Garrett 1971; Beit-Hallahmi 1979 **OCEANIA** *Australia*: Feather 1982; Ho 1984
Females more	**ASIA** *India*: Furnham & Rajamanickam 1992:410* **EUROPE** *Britain*: Furnham & Rajamanickam 1992:410*; Mellanby et al. 2000:384 (college)

6.2.14.2. Workaholism/Careerism

Most research has indicated that careerism and workaholism are more prevalent in postpubertal males than in their female counterparts (Table 6.2.14.2).

Table 6.2.14.2. Workaholism/careerism.

Nature of Any Dif-ference	Postpubertal	Multiple Age Categories
	Adult	
Males more	**EUROPE** *Finland*: Haavio-Mannila 1971a **MIDDLE EAST** *Israel*: Leviatan 1976; Palgi 1976	**NORTH AMERICA** *United States*: Saleh & Lalljee 1969*; Bryson et al. 1978 (married couples); FM Andrews & Whitey 1979; JE Parsons & Goff 1980
No signif. difference		**NORTH AMERICA** *United States*: Saleh & Lalljee 1969* (years of education controlled)
Females more		

6.2.14.3. Centrality of One's Job (Outside the Home) to One's Life as a Whole

Research has consistently revealed that males consider their jobs to be a more important aspect of their lives than do females (Table 6.2.14.3).

Table 6.2.14.3. Centrality of one's job (outside the home) to one's life as a whole.

Nature of Any Difference	Prepubertal				Postpubertal		Multiple Age Categories
				Childhood	Adolescent	Adult	
Males more				**NORTH AMERICA** *United States*: Goff-Timmer et al. 1984	**NORTH AMERICA** *United States*: Douvan & Adelson 1966	**NORTH AMERICA** *United States*: Lowenthal & Chiriboga 1972; Neugarten & Haestad 1976; Major 1993; Honeycut & Rosen 1997	**MIDDLE EAST** *Israel*: Izraeli 1994 **NORTH AMERICA** *United States*: Lowenthal et al. 1975; Bryson et al. 1978 (married couples); JE Parsons & Goff 1980; CA Thompson & Blau 1993
No signif. difference							
Females more							

6.2.14.4. Choosing Family Responsibilities Over Career When the Two Conflict

Closely related to the centrality of one's job to one's life (see above table) is one's willingness to choose family over career when the two conflict. As shown in Table 6.2.14.4, all available evidence indicates that females are more willing than males to forego a career if it conflicts with family responsibilities.

Table 6.2.14.4. Choosing family responsibilities over career when the two conflict.

Nature of Any Difference					Postpubertal		Multiple Age Categories
						Adult	
Males more							
No signif. difference							
Females more						**NORTH AMERICA** *United States*: Herzog & Bachman 1982; SL Archer 1985	**NORTH AMERICA** *United States*: R Bryson et al. 1978; Corcoran & Duncan 1979 (miss work due to child illness); Tittle 1981; Veroff 1983; E Ginzberg 1984

6.2.14.5. Planning for Retirement

The two available studies both concluded that among workers, men make more concrete plans with regard to retirement (or they believe that it is more important to do so) than is true for women (Table 6.2.14.5).

Table 6.2.14.5. Planning for retirement.

Nature of Any Difference					Postpubertal	
						Adult
Males more						**NORTH AMERICA** *United States*: E R Kragic et al. 1989; DA Hershey et al. 2002 (20-67 years old)
No signif. difference						
Females more						

6.2.15. Aspects of Occupations That Affect Preferences

A number of studies have sought to determine what aspects of an occupation is most appealing to people (rather than what specific occupations are most appealing). The findings from these investigations are reviewed below.

6.2.15.1. Interest in Creative/Artistic/Aesthetic Occupations

Research has consistently shown that females have a greater interest in careers related to aesthetics and artistic matters than do males (Table 6.2.15.1).

Table 6.2.15.1. Interest in creative/artistic/aesthetic occupations.

Nature of Any Difference	Postpubertal		Multiple Age Categories
	Adolescent	Adult	
Males more			
No signif. difference			**MIDDLE EAST** *Israel*: Gati et al. 1995
Females more	**NORTH AMERICA** *United States*: Williamson & Darley 1935:366; Terman & Miles 1936:447; Kuder 1946 (literary, musical); Flanagan & Cooley 1966; Wijting et al. 1978; B Mannheim 1988	**NORTH AMERICA** *United States*: Traxler & McCall 1941 (young); Blustein 1988 (young)	**NORTH AMERICA** *United States*: Buchholtz 1978; Bloch & Rim 1979

6.2.15.2. Preference for a Helping/Social Service Occupation

Nearly all studies have concluded that females are more interested than males in jobs that involve helping others (Table 6.2.15.2).

Table 6.2.15.2. Interest in helping/social service occupations.

Nature of Any Difference	Postpubertal		Multiple Age Categories
	Adolescent	Adult	
Males more			
No signif. difference	**NORTH AMERICA** *United States*: Williamson & Darley 1935:366 (social work)		
Females more	**NORTH AMERICA** *United States*: Terman & Miles 1936:447; Kuder 1946 (clerical, interpersonal); Douvan & Adelson 1966:37; Flanagan & Cooley 1966; Lueptow 1980; Fiorentine 1988b:150; RS Powers & Wojtkiewicz 2004:610	**NORTH AMERICA** *United States*: Traxler & McCall 1941 (young)	**NORTH AMERICA** *United States*: Lehman & Witty 1931

6.2.15.3. Preference for Medical/Health-Related Occupations

One study concluded that adolescent females were more interested in occupations that provided medical and health care than were adolescent males (Table 6.2.15.3).

Table 6.2.15.3. Preference for medical/health care occupations.

Nature of Any Dif-ference	Postpubertal
	Adolescent
Males more	
No signif. difference	
Females more	**NORTH AMERICA** *Canada*: Lupart et al. 2004:37

6.2.15.4. Preference for Outdoor (Versus Indoor) Occupations

Most studies have concluded that males exhibited more of a preference than females in occupations that involve working outdoors more than indoors (Table 6.2.15.4).

Table 6.2.15.4. Preference for outdoor (versus indoor) occupations.

Nature of Any Dif-ference	Postpubertal	
	Adolescent	Adult
Males more	**NORTH AMERICA** *United States*: Miner 1922; Terman & Miles 1936:447; Flanagan & Cooley 1966	**NORTH AMERICA** *United States*: Holvey et al. 1986 (disabled, young)
No signif. difference	**NORTH AMERICA** *United States*: Williamson & Darley 1935:366 (agriculture/forestry)	
Females more		

6.2.15.5. Preference for Physically Active Occupations

According to one study, males preferred occupations that involved considerable physical activity to a greater extent than did females (Table 6.2.15.5).

Table 6.2.15.5. Preference for physically active occupations.

Nature of Any Difference				Postpubertal		
				Adolescent		
Males more				**NORTH AMERICA** *United States*: Terman & Miles 1936:447		
No signif. difference						
Females more						

6.2.15.6. Preference for Retail Sales Occupations

One study found that females expressed a greater preference for occupations that involved retail sales than was true for males (Table 6.2.15.6).

Table 6.2.15.6. Preference for retail sales occupations.

Nature of Any Difference				Postpubertal		
				Adolescent		
Males more						
No signif. difference						
Females more				**NORTH AMERICA** *United States*: Williamson & Darley 1935:366		

6.2.15.7. Preference for Skilled Manual Labor Occupations

No significant difference was found in adolescent males' and adolescent females' expressed preferences for skilled manual labor occupations (Table 6.2.15.7).

Table 6.2.15.7. Preference for skilled manual labor occupations.

Nature of Any Difference				Postpubertal		
				Adolescent		
Males more						
No signif. difference				**NORTH AMERICA** *United States*: Williamson & Darley 1935:366		
Females more						

6.3

ATTITUDES

Attitudes have to do with opinions that people hold regarding almost every topic imaginable. The available research on sex differences reflects this wide diversity of topics.

6.3.1. General Features of Opinions and Attitudes

Gender differences in a variety of general features of opinions and attitudes are explored below.

6.3.1.1. Attitudes Toward Rule Following

One study concluded that girls were more willing than boys to permit exceptions to be made to rules pertaining to the games they played (Table 6.3.1.1).

Table 6.3.1.1. Attitudes toward rule following.

Nature of Any Dif-ference	Prepubertal					
				Childhood		
Males allow more exceptions						
No signif. difference						
Females allow more exceptions				**EUROPE** *Switzerland*: Piaget 1932:32		

6.3.1.2. Sensitivity/Responsiveness to the Opinions of Others

The studies that have sought to determine if sex differences exist in sensitivity to the opinions of others have all concluded that girls have greater sensitivity than do boys (Table 6.3.1.2).

Table 6.3.1.2. Sensitivity/responsiveness to the opinions of others.

Nature of Any Difference				Childhood		
Males more						
No signif. difference						
Females more				**NORTH AMERICA** *United States*: Iscoe et al. 1964 (with same-sex peers); Costanzo & Shaw 1966 (with same-sex peers); FW Schneider 1970 (with same-sex peers)		

6.3.1.3. Holding Strong Beliefs/Opinions (Being Opinionated)

The available research on gender differences in the tendency to hold strong beliefs indicates that this is more characteristic of males than of females (Table 6.3.1.3).

Table 6.3.1.3. Holding strong beliefs/opinions (being opinionated).

Nature of Any Difference					Postpubertal		Multiple Age Categories
					Adolescent	Adult	
Males more					**NORTH AMERICA** *United States*: Mulac et al. 1990 (written essays)	**EUROPE** *Britain*: Stobart et al. 1992 (college, written exams) **NORTH AMERICA** *United States*: Rubin & Greene 1992 (college, written papers)	**NORTH AMERICA** *United States*: Mulac & Lundell 1986
No signif. difference							
Females more							

6.3.1.4. Susceptibility to Persuasion (Gullibility)

The degree to which one can be persuaded measures one's proneness to change her/his opinion(s) as a result of directed suggestions from others. A vast amount of research has accumulated on the gender differences in people's susceptibility to the arguments or assertions of others. As shown in Table 6.3.1.4, these studies have reached inconsistent conclusions although the majority of studies have concluded that either no significant gender differences are apparent or that females are more susceptible than males.

Table 6.3.1.4. Susceptibility to persuasion (gullibility).

Nature of Any Difference					Postpubertal		Multiple Age Categories
					Adolescent	Adult	
Males more						**AFRICA** *Kenya*: Feldman 1975 **NORTH AMERICA** *United States*: Kirkpatrick 1936	
No signif. difference					**NORTH AMERICA** *United States*: Insko et al. 1965; E. Willis 1940; Eagly & Warren 1976	**AFRICA** *Rhodesia*: Whittaker & Meade 1967* **ASIA** *Taiwan*: Chu 1966 **LATIN AMERICA** *Brazil*: Whittaker & Meade 1967*; *Peru*: Whittaker & Meade 1967* **MIDDLE EAST** *Israel*: J Rosenberg 1965*; *Lebanon*: Whittaker & Meade 1967* **NORTH AMERICA** *United States*: Marquis 1973; EE Willis 1940; Forer 1949; Haiman 1949*; Cathcart 1955; Sikkink 1956; Stanley & Klausmeier 1957; Goldstein 1959; Middleton 1960; Zimbardo 1965; Greenbaum 1966; Leventhal et al. 1966*; Silverman et al. 1966*; Linder et al. 1967; Nisbett & Gordon 1967; Whittaker & Meade 1967*; Silverman 1968; Dillehay & Jernigan 1970; Hjelle & Clouser 1970; Osterhouse & Brock 1970; Rule & Rehill 1970; I Silverman et al. 1970; Spiegel & Greenwald 1970; Worchel & Brehm 1970; Biondo & MacDonald 1971; Dean et al. 1971; Eagly & Acksen 1971; Eagly & Telaak 1972; Eagly & Whitehead 1972; Zillmann & Cantor 1974; CW Sherif et al. 1973; Eagly 1974; Sloan et al. 1974; Snyder 1974; Eagly & Chaiken 1975; Gray & Ashmore 1975; Laird & Berglas 1975; Cantor et al. 1976; Chaiken & Eagly 1976; Halperin et al. 1976; Steinbacher & Gilroy 1976; Zanna et al. 1976; Chaiken et al. 1978; Eagly et al. 1978	
Females more					**NORTH AMERICA** *United States*: HE Garrett & Fisher 1926 (being gullible); Bateman & Remmers 1941; McGuire 1984	**ASIA** *Hong Kong*: Whittaker & Meade 1967*; *India*: Singh 1970 **MIDDLE EAST** *Israel*: J Rosenberg 1965* **NORTH AMERICA** *United States*: Knower 1935; Knower 1936; Haiman 1949*; Paulson 1954; Janis & Field 1959 (young); Scheidel 1963; Furbay 1965; Whittaker 1965a; H Leventhal et al. 1966*; Silverman et al. 1966*; Burgoon et al. 1975; TA Roberts & Nolen-Hoeksema 1989 (college); Graziano et al. 1993 (physical attractiveness ratings); TA Roberts & Nolen-Hoeksema 1994 (college); S Putrevu 2004 (college, influenced by advertisings); Fisher & Dube 2005 (college, persuasion by advertising)	**NORTH AMERICA** *United States*: AR Cohen 1964

6.3.1.5. Tolerance of Nonconformity

One study concluded that females are generally more tolerant than males of people who defy conventionality (Table 6.3.1.5).

Table 6.3.1.5. Tolerance of nonconformity.

Nature of Any Dif-ference	Prepubertal					
				Childhood		
Males more tolerant						
No signif. difference						
Females more tolerant				**INTERNATIONAL** *Multiple Countries*: Torney et al. 1975 (social nonconformity)		

6.3.1.6. Attitudes Toward Dishonesty and Deception

One study concluded that females more strongly condemned dishonesty and deception than did males (Table 6.3.1.6).

Table 6.3.1.6. Attitude toward dishonesty and deception.

Nature of Any Difference						
						Adult
Males more condemning						
No signif. difference						
Females more condemning						**NORTH AMERICA** *United States*: Camden et al. 1984

6.3.1.7. Racial Prejudice

Racial prejudice is comprised of beliefs that races or ethnic groups are generally superior or inferior to others in a limited or an unlimited number of fields. Most studies have concluded that males are more likely than females to express views that reflect racial prejudice (Table 6.3.1.7).

Table 6.3.1.7. Racial prejudice.

Nature of Any Dif-ference	Prepubertal				Postpubertal		Multiple Age Categories
				Childhood	Adolescent	Adult	
Males more				**NORTH AMERICA** *United States*: Moore et al. 1984* (grade 6, explicit racial prejudice)	**EUROPE** *Sweden*: Sidanius & Ekehammar 1980:29; Sidanius et al. 1991:143 **NORTH AMERICA** *United States*: Moore et al. 1984* (grades 8-10, explicit racial prejudice); Bierly 1985	**NORTH AMERICA** *United States*: Burnham et al. 1969 (college, whites); Qualls et al. 1992 (college, explicit racial prejudice); Sidanius & Pratto 1993:393 (young); Hoxter & Lester 1994 (college, explicit racial prejudice); Altemeyer 1998 (explicit racial prejudice); Sidanius & Pratto 1999 (explicit racial prejudice); Whitley 1999 (college, less than 26 yrs, explicit racial prejudice)	**EUROPE** *Britain*: HJ Eysenck 1971:205; *Germany*: Watts 1996 (15-20 yrs, explicit racial prejudice)
No signif. difference						**NORTH AMERICA** *United States*: Bogardus 1939; Noel & Pinkney 1964 (college)	
Females more							**EUROPE** *Sweden*: Ekehammar et al. 2003 (17-49 year olds, implicit racial prejudice)

6.3.2. Attitudes Toward Sex Differences

Findings regarding approving and disapproving attitudes that males and females have toward various sex differences, especially regarding behavior, are reviewed in the following tables.

6.3.2.1. Attitude Toward Sex Differences in General

Limited research demonstrates in Table 6.3.2.1 that females have a more favorable attitude toward general sex differences.

Table 6.3.2.1. Attitude toward sex differences in general.

Nature of Any Difference					Postpubertal	
						Adult
Males more favorable						
No signif. difference						
Females more favorable						**MIDDLE EAST** *Israel*: S Feinman 1981 **NORTH AMERICA** *United States*: Fagot 1974 (cross sex role behavior more tolerated)

6.3.2.2. Attitude Toward Maintaining Distinct Sex Roles

The studies that have sought to determine which sex is more supportive of maintaining traditional sex roles have all concluded that males expressing more favorable attitudes toward doing so than do females (Table 6.3.2.2).

Table 6.3.2.2. Attitude toward maintaining distinct sex roles.

Nature of Any Difference					Postpubertal	
					Adolescent	Adult
Males more					**NORTH AMERICA** *Canada*: Lupart et al. 2004:38 (traditional roles)	**NORTH AMERICA** *United States*: JT Spence & Helmreich 1972 (college); JT Spence & Helmreich 1982 (college); RJ Simon & Landis 1989 (in marriage); B Jones & McNamara 1991:27 (college); Amato & Booth 1995 (as contributing to marital satisfaction)
No signif. difference						
Females more						

6.3.3. Attitudes Toward Gender Equality

Studies of gender differences in attitudes surrounding gender equality have received considerable research attention. The findings from these studies are summarized in the following tables.

6.3.3.1. Attitude Toward Gender Equality/Women's Rights in General

Table 6.3.3.1 shows that the vast majority of studies of both adolescents and adults have concluded that females have more favorable attitudes toward women's rights and gender equality issues than males. A meta-analysis concluded that both sexes have grown in their expression of pro-women's rights attitudes between 1970 and the mid 1990s, especially in the case of women themselves (Twenge 1997:42).

Table 6.3.3.1. Attitude toward gender equality/women's rights in general.

Nature of Any Difference					Postpubertal		Multiple Age Categories
					Adolescent	Adult	
Males more supportive							
No signif. difference						**NORTH AMERICA** *United States*: RJ Simon & Landis 1989 (in the 1980s); Thiessen & Ross 1990:302 (college); EA Cook & Wilcox 1991	**NORTH AMERICA** *Canada*: Rhodebeck 1996:392; *United States*: Deitch 1988; C Clark & Clark 1993
Females more supportive					**AFRICA** *Fiji*: Basow 1982; Basow 1986 **EUROPE** *Italy*: Caballero 1971 **MIDDLE EAST** *Israel*: Seginer et al. 1990 **INTERNATIONAL** *Multiple Countries*: Offer et al. 1988; JL Gibbons et al. 1991	**ASIA** *China*: Sidanius et al. 2000* (college); *Japan*: Iwawaki & Eysenck 1978 (college); Bankart 1985 (college); *Russia*: Sidanius et al. 2000* (college) **EUROPE** *Britain*: S Welch & Thomas 1988:34; *Netherlands*: JL Gibbons et al. 1990 (young); *Northern Ireland*: J Kremer & Curry 1987 (young); *Sweden*: Intons-Peterson 1988 (young) **MIDDLE EAST** *Irael*: Sidanius et al. 2000* (college); *Turkey*: Sakalli 2002 **NORTH AMERICA** *United States*: Spence & Helmreich 1972; Spence et al. 1973; Greenhouse & Rosenthal 1974; Etaugh & Bowen 1976; I Diamond 1977 (among state legislators); M Johnson et al. 1978 (among legislators); Spence & Helmreich 1978; Spence & Helmreich 1979 (college); Basow & Howe 1980; Helmreich et al. 1982; Koblinsky & Palmeter 1984; McKinney 1987; Etaugh & Spiller 1989; Saint-Germain 1989; P Glick & Fiske 1997 (college); Sidanius et al. 2000* (college) **OCEANIA** *New Zealand*: Sidanius et al. 2000* (college)	**EUROPE** *Several European Countries*: Wilcox 1991; Morgan & Wilcox 1992 **NORTH AMERICA** *United States*: Poole & Zeigler 1985:144 **OCEANIA** *Australia*: J Baxter 1988:91 (married couples)

6.3.3.2. Attitude Toward Gender Equality in Household Affairs

The acceptance of gender equality in the home usually refers to such things as sharing household chores and decision-making. Table 6.3.3.2 shows that while one study found no significant sex difference, two others concluded that females were more sympathetic toward the need for equality in this regard.

Table 6.3.3.2. Attitude toward gender equality in household affairs.

Nature of Any Difference					Postpubertal	
						Adult
Males more						
No signif. difference						**NORTH AMERICA** *United States*: L Chang 1999:736* (young)
Females more						**ASIA** *China*: L Chang 1999:736* (young) **NORTH AMERICA** *United States*: RJ Simon & Landis 1989

6.3.3.3. Attitude Toward Gender Equality in the Military

Males were more inclined than females to favor equal treatment of the sexes in the military according to the one available study (Table 6.3.3.3).

Table 6.3.3.3. Attitude toward gender equality in the military.

Nature of Any Difference					Postpubertal	
						Adult
Males more						**NORTH AMERICA** *United States*: LL Miller 1997 (military personnel, equal treatment)
No signif. difference						
Females more						

6.3.3.4. Attitude Toward Gender Equality in the Workplace

The acceptance of gender equality in the workplace is usually measured through self-reports. As seen in Table 6.3.3.4, females in both Asia and the United States are found to be more accepting of gender equality in the workplace.

Table 6.3.3.4. Attitude toward gender equality in the workplace.

Nature of Any Difference					Postpubertal	
						Adult
Males more						
No signif. difference						
Females more						**ASIA** *China*: L Chang 1999:736*(young) **NORTH AMERICA** *United States*: L Chang 1999:736* (young)

6.3.3.5. Attitude Toward Gender Equality in Political Candidates

Sex differences in people's beliefs that men and women should be equally represented in the political arena or an expressed willingness to support female political candidates have been investigated in several studies. As shown in Table 6.3.3.5, these studies have reached different conclusions, but most have indicated that females are more supportive of such equality or of more female candidates than are males.

Table 6.3.3.5. Attitude toward gender equality in political candidates.

Nature of Any Difference					Postpubertal	
					Adolescent	Adult
Males more						**NORTH AMERICA** *United States*: Ferree 1973 (for president)
No signif. difference						**NORTH AMERICA** *United States*: Sigelman & Welch 1984* (among Whites, for president); Dolan 1997 (in choosing a local candidate vs. national office)
Females more					**NORTH AMERICA** *United States*: D Gillespie & Spohn 1987; D Gillespie & Spohn 1990	**EUROPE** *Britain*: Studlar & Welch 1986* **NORTH AMERICA** *United States*: Hershey 1977; Hershey 1980; Sigelman & Welch 1984* (among Blacks, for president); Dolan 1997

6.3.3.6. Perception of Sex Discrimination

Two studies concluded that when individuals are excluded from participating in a social activity, girls were more likely than boys to perceive the exclusion as reflecting sex discrimination (Table 6.3.3.6).

Table 6.3.3.6. Perception of sex discrimination.

Nature of Any Difference	Prepubertal					
				Childhood		
Males more						
No signif. difference						
Females more				**NORTH AMERICA** *United States*: Theimer et al. 2001 (when excluded from social participation); CS Brown & Bigler 2004 (when excluded from social participation)		

6.3.4. Attitudes Toward Homosexuality

Considerable research has been conducted on attitudes toward homosexuality. Findings surrounding sex differences in these attitudes are summarized in the following subsection.

6.3.4.1. Attitude Toward Homosexuality (Homophobia) in General

Negative attitudes toward homosexuals (homophobia) are usually measured using self-report tests. Table 6.3.4.1 shows that the majority of studies have found such attitudes to be more prevalent among males than among females, a conclusion also reached in a meta-analysis by Kite (1984).

Table 6.3.4.1. Attitudes toward homosexuality (homophobia) in general.

Nature of Any Difference				Postpubertal		Multiple Age Categories
				Adolescent	Adult	
Males more unfavorable or non-accepting				**NORTH AMERICA** *Canada*: Morrison et al. 1997 (grades 10 & 12); *United States*: Sorensen 1972 (high school)	**EUROPE** *Netherlands*: Jelen et al. 1994:179 **LATIN AMERICA** *Chile*: Almagia 2002 (college) **MIDDLE EAST** *Turkey*: Sakalli 2002 (college) **NORTH AMERICA** *United States*: Larsen et al. 1980 (college); M Young & Whertvine 1982 (young); Herek 1984; Maret 1984; RA Bouton et al. 1987; Herek 1988; Whitley 1988; T McDevitt et al. 1989; K Bruce et al. 1990 (college); D'Augelli & Rose 1990 (college, caucasion); Chng & Moore 1991(college); Kunkle & Temple 1992 (college); Roese et al. 1992 (college, touching another male); Wells & Daly 1992 (college); S Green et al. 1993 (college); RK Young et al. 1993; Whitley & Kite 1995 (young); Herek & Capitanio 1996; Hogan & Rentz 1996 (college, personnel); Kemph & Kasser 1996:402 (college); Logan 1996 (college); T O'Hare et al. 1996 (college); Berkman & Zinberg 1997 (social workers); Prataroli & Donaldson 1997; D'Angelo et al. 1998 (college, people with AIDS); Kite & Whitley 1998; CR Waldo 1998:758 (college); Smith & Gordon 1998 (college); Childers 2000; Whitley & Egisdottir 2000; Wills & Crawford 2000; Herek 2002:42 **OCEANIA** *Australia*: Heaven & Oxmon 1999 (college)	**LATIN AMERICA** *Brazil*: Steibel 1999 **NORTH AMERICA** *United States*: Pratte 1993 (18-86 years old, college, general population); Simoni 1996 (college, 17-49 years old); Johnson et al. 1997 (18-53 years old, college); Louderback & Whitley 1997 (17-25 years old, college); Lamar & Kite 1998 (college, 17-22 years old); Hoover & Fishbein 1999 (12 years old-college) **OCEANIA** *Australia*: Hong 1984 (21-50 years old); Van de Ven 1994 (14-25 years old, college, high school, & young offenders)
No signif. difference					**ASIA** *South Korea*: HS Lim & Johnson 2001 (undergraduate and graduate students in social work) **EUROPE** *Britian*: Davies 2004 (college, civil rights) **NORTH AMERICA** *United States*: Rees & Zimmerman 1974 (college); Weinborger & Millham 1979 (college); Millham et al. 1976 (college); Minnigerode 1976 (college); Leitenberg & Slavin 1983 (college, political and civil rights); Cerny & Polyson 1984 (college); Pagtolun-An & Clair 1986 (college); Wells & Franken 1987 (college); Vanderstoep & Green 1988 (college); Klassen et al. 1989 (political and civil rights); Wells 1989 (college); Stevenson & Gajarsky 1990 (college); SM Wilson & Medora 1990 (college, toward homosexual behavior); Snively et al. 2004 (social workers)	**NORTH AMERICA** *Canada*: B O'Neill 2001:283 (toward gay rights)
Females more non-accepting					**NORTH AMERICA** *United States*: Douglas et al. 1985 (nurses); J Wells & Daly 1992 (college)	

6.3.4.2. Acceptance/Tolerance of Homosexuality

Numerous studies have sought to determine if males or females are more tolerant of homosexuality. As shown in Table 6.3.4.2, the vast majority of studies have concluded that females are more likely to express tolerant or accepting opinions about homosexuality than are men. The only exceptions have been in the case of female homosexuality, which a couple of studies found males being more tolerant than females. This general tendency toward greater tolerance by females has also been reached by various traditional meta-analyses (Whitley & Kite 1995; Kite & Whitley 1996).

Table 6.3.4.2. Acceptance/tolerance of homosexuality.

Nature of Any Difference					Postpubertal		Multiple Age Categories
					Adolescent	Adult	
Males more favorable/ accepting						**EUROPE** *Germany*: Seise et al. 2002* (female homosexuality) **NORTH AMERICA** *United States*: Whitley 1987:108 (female homosexuality)	
No signif. difference							
Females more favorable/ accepting					**EUROPE** *Britain*: Thur low 2001 (Wales) **NORTH AMERICA** *Canada*: Malcolm & Shepard 1978 (ages 14-17); *United States*: Price 1982 (11th & 12th grades)	**ASIA** *China*: LT Higgins et al. 2002:86* (college); *Philippines*: Ernulf et al. 1989* (liberal); *Singapore*: Lim 2002 (college) **EUROPE** *Britain*: Wellings & Wadsworth 1990; Wellings et al. 1994; BC Hayes 1995; LT Higgins et al. 2002:86* (college); *Germany*: Seise et al. 2002* (toward male homosexuality); Steffens & Wagner 2004; *Italy*: Lingiardi et al. 2005 (college students & military personnel); *Norway*: Anderssen 2002 (ages 19-21); *Sweden*: Ernulf et al. 1989*(liberal) **LATIN AMERICA** *Chile*: Barra Almagia 2002 (college, ages 17-31, toward male homosexuality); *Puerto Rico*: Toro-Alfonso & Varas-Diaz 2004 (college) **MIDDLE EAST** *Turkey*: Sakalli 2002 (college) **NORTH AMERICA** *Canada*: Turnbull & Brown 1977 (college); *United States*: Conley & O'Rourke 1973 (college, liberal); Nuth & Sedlacek 1974 (college); Dearth & Cassell 1976 (college, liberal); Glassner & Owen 1976 (college); Millham & Weinberger 1977 (college); Nyberg & Alston 1977 (college); Thompson & Fishburn 1977 (graduate counseling students); Garfinkle & Morin 1978 (psychotherapists, liberal); Dressler 1979 (law students, liberal); Weis & Dain 1979 (college); Krulewitz & Nash 1980; Larsen et al. 1980 (college); Cuenot & Fugita 1982 (college); Hansen 1982a (college); Hansen 1982b (college); Young & Whertvine 1982 (college); Aguero et al. 1984 (college); Black & Stevenson 1984 (college); Maret 1984 (college); Schneider & Lewis 1984 (political and civil rights); Bierly 1985 (17-45 yrs); Kile & Deauy 1986 (college); Bouton et al. 1987 (college); Dhooper et al. 1987 (social workers, liberal); Gentry 1987 (college, liberal); Whitley 1987 (college); Cameron et al. 1988 (liberal); Clark & Maass 1988 (college, liberal, civil rights); Goodwin & Roscoe 1988 (college); Grieger & Ponterotto 1988 (college); Herek 1988 (college); Kurdek 1988 (college); D'Augelli 1989 (college, liberal); Ernulf et al. 1989*(liberal); Qualls et al. 1992 (college, liberal); Eliason 1997; MR Smith & Gordon 1998 (college); C Clark & Clark 1999; Whitley 1999 (college, liberal); Herek 2000 (toward male homosexuality); Whitley & Egisdottir 2000 (ages 18-24, college); Barrett & MacWhirter 2002 (counseling graduate students); Battle & Lemelle 2002 (Blacks, toward male homosexuality); Finken 2002 (young, college); Herek 2002 (genetic factors cause homosexuality); Mazuer & Emmers-Sommer 2002; Otis & Skinner 2004 (genetic fatcotrs cause homosexuality); Schwartz & Lindley 2005 (college) **INTERNATIONAL** *Multiple Countries*: Kyes & Tumbelaka 1994 (US and Indonesia)	**EUROPE** *Germany*: Steffens & Wagner 2004 (ages 14-69) **NORTH AMERICA** *United States*: L Harris 1965; Herek & Capitanio 1995 (Blacks); Herek & Capitanio 1996; Strand 1998; Haeberle 1999; Herek & Capitanio 1999; GB Lewis & Rogers 1999; Herek 2002

6.3.4.3. Attitude Toward Male Homosexuality

As revealed in Table 6.3.4.3, the majority of studies show that males hold more negative attitudes toward male homosexuality than do females.

Table 6.3.4.3. Attitude toward male homosexuality.

Nature of Any Dif-ference					Postpubertal		Multiple Age Categories
					Adolescent	Adult	
Males more negative or nonaccepting					**NORTH AMERICA** *United States*: Baker & Fishbein 1998 (grades 7, 9, and 11)	**ASIA** *Indonesia*: Kyes & Tumbelaka 1994* **EUROPE** *Britain*: Johnson et al. 1994 (young adult, more likely to believe that sex between two men is wrong) **MIDDLE EAST** *Israel*: Lieblich & Friedman 1985* (college) **NORTH AMERICA** *Canada*: Schellenberg et al. 1999; *United States*: Gurwitz et al. 1978 (college); Laner & Laner 1979 (college); Gross et al. 1980 (college); M Young & Whertvine 1982 (young); Herek 1984; Maret 1984; Lieblich & Friedman 1985* (college); RA Bouton et al. 1987; Herek 1988; Whitley 1988; T McDevitt et al. 1989; K Bruce et al. 1990 (young); D'Augelli & Rose 1990; Whitley 1990 (college); Chng & Moore 1991 (young); Kunkle & Temple 1992; Wells 1992; S Green et al. 1993 (young); RK Young et al. 1993; Kerns & Fine 1994; Kyes & Tumbelaka 1994*; Whitley & Kite 1995 (young); Kemph & Kasser 1996:402 (young); Kite & Whitley 1996 (young); T O'Hare et al. 1996; Derlega et al. 1998; Kite & Whitley 1998; CR Waldo 1998:758 (young); Herek & Capitanco 1999; Whitley & Egisdottir 2000; Lemelle & Battle 2004 (Blacks) **OCEANIA** *New Zealand*: Dickson et al. 2003:1610 (young adult, viewed as wrong)	**EUROPE** *Germany*: Steffens & Wagner 2004 (ages 14-69) **LATIN AMERICA** *Brazil*: Steibel 1999 (toward male homosexuals) **OCEANIA** *Australia*: Polimeni et al. 2000
No signif. difference						**NORTH AMERICA** *United States*: Steffensmeier & Steffensmeier 1974 (college); SM Wilson & Medora 1990 (college, toward homosexual behavior); Wood 1990 (civil and political rights); Shaw et al. 1994 (providing help to motorist)	**LATIN AMERICA** *Brazil*: Proulx 1997 **NORTH AMERICA** *Canada*: B O'Neill 2001:283 (toward gay rights)
Females more negative or nonaccepting						**NORTH AMERICA** *Canada*: Fraser et al. 1995 (prospective adult homosexual parents rated by college students); *United States*: J Wells & Daly 1992 (young)	

6.3.4.4. Attitude Toward Female Homosexuality

Research findings on sex differences in attitudes specifically toward female homosexuality present a mixed picture (Table 6.3.4.4).

Table 6.3.4.4. Attitude toward female homosexuality.

Nature of Any Dif-ference					Postpubertal		Multiple Age Categories
					Adolescent	Adult	
Males more negative or non-accepting						**MIDDLE EAST** *Israel*: Lieblich & Friedman 1985* (college) **NORTH AMERICA** *Canada*: Fraser et al. 1995; *United States*: M Young & Whertvine 1982 (young); Herek 1984; Maret 1984; Lieblich & Friedman 1985* (college); R Bouton et al. 1987; Herek 1988; Whitley 1988; T McDevitt et al. 1989; K Bruce et al. 1990 (young); Chng & Moore 1991 (young); Kunkle & Temple 1992; S Green et al. 1993 (young); RK Young et al. 1993; Whitley & Kite 1995 (young); Kemph & Kasser 1996:402 (young); Kite & Whitley 1996 (young); T O'Hare et al. 1996; CR Waldo 1998:758 (young); Whitley & Egisdottir 2000	**LATIN AMERICA** *Brazil*: Steibel 1999 (toward male homosexuals)
No signif. difference						**NORTH AMERICA** *United States*: Steffensmeier & Steffensmeier 1974 (college); Laner & Laner 1980 (college); SM Wilson & Medora 1990 (college, toward homosexual behavior); Kerns & Fine 1994	**EUROPE** *Germany*: Steffens & Wagner 2004 (ages 14-69) **NORTH AMERICA** *Canada*: B O'Neill 2001:283 (toward gay rights)
Females more negative or non-accepting					**NORTH AMERICA** *United States*: Baker & Fishbein 1998 (grades 7, 9, and 11)	**EUROPE** *Germany*: Seise et al. 2002 (female homosexuality) **NORTH AMERICA** *United States*: Gross et al. 1980 (college); Smith et al. 1980 (college); Gentry 1987 (college); Whitley 1987:108; Whitley 1988; Whitley 1990 (college); J Wells & Daly 1992 (young) **OCEANIA** *New Zealand*: Dickson et al. 2003:1610 (young adult, females more likely to consider same-sex relationships wrong for females than for men)	**ASIA** *Indonesia*: Kyes & Tumbelaka 1994* **NORTH AMERICA** *United States*: Kyes & Tumbelaka 1994* **LATIN AMERICA** *Brazil*: Proulx 1997 **OCEANIA** *Australia*: Polimeni et al. 2000

6.3.5. Attitudes Toward Rape and Dating Violence

In recent decades, researchers have explored people's attitudes toward topics such as rape and dating violence. Findings are summarized in the following subsection.

6.3.5.1. Excusing/Tolerating Rape

As indicated in Table 6.3.5.1, the tendency to excuse or tolerate rape has been found to be consistently higher in males than females.

Table 6.3.5.1. Excusing/tolerating rape.

Nature of Any Dif-ference	Postpubertal
	Adult
Males more accepting/ tolerant	**NORTH AMERICA** *Canada*: Check & Malamuth 1983 (college); *United States*: MR Burt 1980; Tieger 1981:155 (young); Krulewitz 1982 (young); Dull & Giacopassi 1987 (young); Muehlenhard & Linton 1987 (young); JS Bridges 1991 (college); D Holcomb et al. 1991 (young); ST Bell et al. 1994 (college); Monson et al. 1996 (marital rape); Ewoldt et al. 2000
No signif. difference	
Females more accepting/ tolerant	

6.3.5.2. Tolerance of Sexual Harassment

Several studies have indicated that males are more likely than females to consider at least minor forms of sexual harassment to be acceptable (Table 6.3.5.2). In other words, they set the threshold of what constitutes real sexual harassment somewhat higher than do females.

Table 6.3.5.2. Tolerance of sexual harassment.

Nature of Any Dif-ference	Postpubertal	
	Adolescent	Adult
Males more	**AFRICA** *South Africa*: Swart et al. 2002:390 (believe physical aggression is part of romantic relationships)	**NORTH AMERICA** *United States*: LJ Rubin & Borgers 1990 (college, higher threshold in defining sexual harassment, tolerant of sexual harassment); T Jones & Remland 1992 (tolerant of sexual harassment); Hurt et al. 1999 (tolerant of sexual harassment); Russell & Trigg 2004 (college, tolerant of sexual harassment)
No signif. difference		
Females more		

6.3.5.3. Assessment as to What Constitutes Flirting/Sexual Come-ons

One study concluded that more forms of social events involving members of the opposite sex were considered forms of flirting by women than was the case for men (Table 6.3.5.3).

Table 6.3.5.3. Assessment as to what constitutes flirting/sexual come-ons.

Nature of Any Dif-ference	Postpubertal
	Adult
Males consider more	
No signif. difference	
Females consider more	**NORTH AMERICA** *United States*: Kowalski 1993 (college, a touch, friendly remark, or eye contact)

6.3.5.4. Attribute Responsibility for Sexual Harassment More to the Victim

According to one study, males believed that the victims of sexual harassment in hypothetical scenarios bore more blame for provoking the harassment than did females (Table 6.3.5.4).

Table 6.3.5.4. Attribute responsibility for sexual harassment more to the victim.

Nature of Any Dif-ference	Postpubertal
	Adult
Males more	**NORTH AMERICA** *United States*: T Jenson & Gutek 1982 (blame females)
No signif. difference	
Females more	

6.3.5.5. Attribute Responsibility for Rape More to the Victim

Often times, people believe that rape victims bear some responsibility for having been victimized (e.g., dressing provocatively, failing to take reasonable precautions). Numerous studies have investigated this phenomenon with respect to sex differences. Table 6.3.5.5 shows that males attribute more responsibility for rape to the victim than do females.

Table 6.3.5.5. Attribute responsibility for rape to the victim.

Nature of Any Dif-ference	Postpubertal	Multiple Age Categories
	Adult	
Males more	**EUROPE** *Britain*: Davies & McCartney 2003 (homosexual male rape) **NORTH AMERICA** *Canada*: Malamuth et al. 1980 (college);*United States*: C Jones & Aronson 1973 (college); LG Calhoun et al. 1976 (college); Feldman-Summers & Lindner 1976 (college); Selby et al. 1977 (college); Seligman et al. 1977 (college); Kanekar & Kolsawalla 1981 (college); Tieger 1981 (college); Thornton & Ryckman 1983; Kanedar et al. 1985; RL Wiener & Rinehart 1986; JS Bridges 1991 (young); Calhoun & Townsley 1991 (young); Langley et al. 1991 (young); Schult & Schneider 1991 (college); J White & Humphrey 1991 (young); ST Bell et al. 1994 (college); Workman & Orr 1996 (young); ME Jones et al. 1998 (college); Workman & Freeberg 1999 (college); Gerber et al. 2004 (college)	**EUROPE** *Britain*: G Calhoun et al. 1978 **NORTH AMERICA** *United States*: RE Smith et al. 1976; Scroggs 1976; Krulewitz & Payne 1978
No signif. difference		
Females more		

6.3.5.6. "Rape-Myth" Acceptance

Rape-myths (Burt 1980) are seen as inaccurate assumptions about rape that are believed to be associated with an elevated likelihood of engaging in sexually coercive behaviors. It is typically measured in self-report tests. As can be seen in Table 6.3.5.6, studies find either greater acceptance of rape myths among males or no significant gender differences.

Table 6.3.5.6. "Rape-myth" acceptance.

Nature of Any Dif-ference	Postpubertal	Multiple Age Categories
	Adult	
Males more	**NORTH AMERICA** *United States*: Giacopassi & Dull 1986 (college); Gilmartin-Zena 1988 (college); Bartling & Eisenman 1994:73 (college)	
No signif. difference	**NORTH AMERICA** *United States*: MR Burt & Albin 1981 (college); Krahe 1988 (college); DL Payne et al. 1999 (young); Buddie & Miller 2002 (college)	**EUROPE** *Britain*: LG Calhoun et al. 1981 **NORTH AMERICA** *United States*: EM Edmonds et al. 1991; LJ Schneider et al. 1994
Females more		

6.3.5.7. Attitude Toward Sexual Abuse

Limited research indicates that women consider sexual abuse to be a more serious offense than do males (Table 6.3.5.7).

Table 6.3.5.7. Attitude toward sexual abuse.

Nature of Any Dif-ference	Postpubertal
	Adult
Males rate more serious	
No signif. difference	
Females rate more serious	**NORTH AMERICA** *United States*: JM Beyers et al. 2000 (college, hypothetical scenarios)

6.3.5.8. Attitude Toward Courtship/Dating Violence/Spouse Abuse

As shown in Table 6.3.5.8, most studies have found no significant male-female difference in the degree of disapprove of abuse in dating and spousal relationships.

Table 6.3.5.8. Attitude toward courtship/dating violence/spouse abuse.

Nature of Any Dif-ference	Postpubertal
	Adult
Males disapprove more	**NORTH AMERICA** *Canada*: Malamuth 1989 (college, verbal coercion to have sex)
No signif. difference	**AFRICA** *South Africa*: Mwamwenda 1999 (college, physical spouse abuse) **NORTH AMERICA** *United States*: JM Beyers et al. 2000 (college, non-sexual dating violence, hypothetical scenarios)
Females disapprove more	**NORTH AMERICA** *United States*: Locke & Richman 1999 (rated domestic violence more seriously in a hypothetical scenario)

6.3.6. Other Sex-Related Attitudes

Findings from studies of sex differences in a variety of attitudes concerning sex- and marriage-related topics are review below.

6.3.6.1. Permissive Attitudes Toward Premarital/Casual Sexual Relationships

Nearly all of a large number of studies have concluded that males have more permissive attitudes toward premarital, or noncommittal, sexual relationships than do females. The exception was a study among adolescents and adults conducted in Denmark in the late 1960s, which reported that females were more accepting than were males (Table 6.3.6.1). This tabular summary coincides with a meta-analysis by Oliver and Hyde (1993) that concluded that at least among adults, males are more accepting of premarital/casual sexual relationships than are females.

Table 6.3.6.1. Permissive attitudes toward premarital/casual sexual relationships.

Nature of Any Difference					Postpubertal		Multiple Age Categories
					Adolescent	Adult	
Males more					**ASIA** *India*: Tikoo 1997 **EUROPE** *Finland*: Kontula et al. 1992; *Norway*: Traeen et al. 1992 **NORTH AMERICA** *United States*: Reiss 1967*; A Hass 1979; R Coles & Stokes 1985; Roche 1986; Moore & Rosenthal 1993 (casual sex or one night stand); Roche & Ramsbey 1993; Chara & Kuennen 1994	**ASIA** *China*: Tang et al. 1997:84 (college); LT Higgins et al. 2002:84 (college); *Japan*: Sprecher & Hatfield 1996* (young); *Russia*: Sprecher & Hatfield 1996* (young) **EUROPE** *Britain*: J Scott 1998:828*****; *Finland*: Kontula & Haavio-Mannila 1995 **NORTH AMERICA** *United States*: Reiss 1967:31*; Gagnon & Simon 1973 (young); WC Wilson 1975; WR Miller & Lief 1976 (young); Zuckerman et al. 1976 (college); Ferrell et al. 1977 (college); K King et al. 1977 (college); Peplau et al. 1977 (young); Laner et al. 1978; R Staples 1978 (young); Glenn & Weaver 1979 (college); Medora & Woodward 1982; Robinson & Jedlicka 1982 (college); Cassel 1984 (casual sex or one night stand); Carrol et al. 1985 (college, casual sex or one night stand); SS Hendrick et al. 1985 (college, casual sex or one night stand); Lottes 1985 (college); Earle & Perricone 1986 (college); McCabe 1987 (college, casual sex or one night stand); C Hendrick & Hendrick 1988 (college); Sprecher et al. 1988; Klassen et al. 1989:389; Sprecher 1989a; SM Wilson & Medora 1990 (college); Herold & Mewhinney 1993 (bar patrons); Janus & Janus 1993 (young); Hendrick & Hendrick 1995;Townsend 1995:182 (college); PC Regan & Berscheid 1996; Sprecher & Hatfield 1996* (young); J Scott 1998:823*; JA Davis & Smith 1999:235; SS Feldman et al. 1999 (young, casual sex or one night stand); Dantzker & Eisenman 2003 (Hispanic, college); RS Lacey et al. 2004 (college) **INTERNATIONAL** *Multiple Countries*: J Scott 1998* (Western countries)	**EUROPE** *Denmark*: HT Christensen & Gregg 1970:619 (1958)* **NORTH AMERICA** *United States*: HT Christensen & Gregg 1970:619 (in 1958)*
No signif. difference							
Females more							**EUROPE** *Denmark*: HT Christensen & Gregg 1970:619 (in 1968)*

6.3.6.2. Comfort Discussing Sex With Parent

A few studies have concluded that females feel more comfort discussing sex with their parents (especially their mothers) than do males (Table 6.3.6.2).

Table 6.3.6.2. Comfort discussing sex with parent.

Nature of Any Difference	Prepubertal				Postpubertal		
				Childhood	Adolescent		
Males more comfortable							
No signif. difference							
Females more comfortable				**NORTH AMERICA** *United States*: Nolin & Peterson 1992	**NORTH AMERICA** *United States*: Guerrero & Afifi 1995 (with mothers); Whalen et al. 1996 (AIDS issues); Dilorio et al. 1999 (with mothers)		

6.3.6.3. Wanting to Be in Love Before Having Sex

Limited research shows that females have a greater preference for being in love before having sex than do males (Table 6.3.6.3).

Table 6.3.6.3. Wanting to be in love before having sex.

Nature of Any Difference	Postpubertal	
	Adolescent	Adult
Rated more important by males		
No signif. difference		
Rated more important by females	**AFRICA** *Mozambique*: Machel 2001:83	**NORTH AMERICA** *United States*: FS Christopher & Cate 1984; Carroll et al. 1985; LL Cohen & Shotland 1996

6.3.6.4. Attitude Toward Nudity

Table 6.3.6.4 indicates that males are more tolerant of or have more favorable attitudes toward nudity than do females.

Table 6.3.6.4. Attitude toward nudity.

Nature of Any Difference	Prepubertal	Postpubertal	
	Childhood	Adolescent	Adult
Males more favorable	**EUROPE** *Britain*: Powell & Stewart 1978:310* (nude swimming)	**EUROPE** *Britain*: Powell & Stewart 1978:310* (nude swimming)	**EUROPE** *Britain*: S Welch & Thomas 1988:34 (nudity in films & magazines) **NORTH AMERICA** *United States*: LaTour 1990 (young)
No signif. difference			
Females more favorable			

6.3.6.5. Attitude Toward People With AIDS

Most people with AIDS are homosexual, heavy drug users, and/or sexually promiscuous. However, some have contracted the disease from unfaithful partners, blood transfusions, and children born to a mother with AIDS. As indicated in Table 6.3.6.5, studies have consistently found females to be more accepting of people with AIDS than are males.

Table 6.3.6.5. Attitude toward people with AIDS.

Nature of Any Dif-ference	Postpubertal
	Adult
Males more accepting	
No signif. difference	
Females more accepting	**NORTH AMERICA** *United States*: Bruce et al. 1990 (young); Gamba 1990 (young); Sheehan et al. 1990 (young); TA Fish & Rye 1991 (young); LE Taylor 1992 (young); Goh 1993 (young); S Green et al. 1993 (young); M James & Fres 1993 (young)

6.3.6.6. Attitudes About Appropriate Age for Sexual Activity

In one study, both sexes were asked to identify the youngest age that would be appropriate for beginning to engage in sexual activity. The results were somewhat mixed, partly due to ethnic differences in opinion (Table 6.3.6.6).

Table 6.3.6.6. Attitudes about appropriate age for sexual activity.

Nature of Any Difference	Postpubertal
	Adult
Males identify older ages	
No signif. difference	**MIDDLE EAST** *Israel*: Hetsroni 2002* (Jewish)
Females identify older ages	**MIDDLE EAST** *Israel*: Hetsroni 2002* (Arab females identify older age)

6.3.6.7. Attitudes Toward Extra-Marital Sex

A few studies have asked men and women their opinions concerning extra-marital sexual relationships. As shown in Table 6.3.6.7, men seem to have more accepting attitudes or express an greater incliniation toward such activities than do women.

Table 6.3.6.7. Attitudes toward extra-marital sex.

Nature of Any Difference					Postpubertal	
						Adult
Males more accepting						**EUROPE** *West Germany*: Sigusch & Schmidt 1973 (young, among the lower social strata) **NORTH AMERICA** *United States*: Peplau et al. 1977 (young); AP Thompson 1984 (young, show greater interest); Seal et al. 1994 (show greater interest)
No signif. difference						
Females more accepting						

6.3.6.8. Attitudes Toward Divorce

One study of sex differences in attitudes toward divorce found no significant difference in overall tendencies to express positive opinions (Table 6.3.6.8).

Table 6.3.6.8. Attitudes toward divorce.

Nature of Any Difference					Postpubertal	
						Adult
Males more accepting or approving						
No signif. difference						**NORTH AMERICA** *United States*: RJ Simon & Landis 1989
Females more accepting or approving						

6.3.6.9. Attitudes Towards Remarriage

One study indicated that males exhibited more accepting attitudes than females toward remarriage (Table 6.3.6.9).

Table 6.3.6.9. Attitudes towards remarriage.

Nature of Any Difference					Postpubertal	
						Adult
Males more accepting						**NORTH AMERICA** *United States*: D Carr 2004 (elderly)
No signif. difference						
Females more accepting						

6.3.6.10. Belief That Masturbation Is Harmful

Men and women were asked if they believed that masturbation was harmful. Only a small percentage of those in Britain believed so, while over half of all women and about a third of all men in China believed so (Table 6.3.6.10).

Table 6.3.6.10. Belief that masturbation is harmful.

Nature of Any Difference					Postpubertal	
						Adult
Males more						
No signif. difference						**EUROPE** *Britain*: LT Higgins et al. 2002:85* (college, 3% for female vs. 5% for males)
Females more						**ASIA** *China*: LT Higgins et al. 2002:85* (college, 58% for females vs. 36% for males)

6.3.6.11. Tolerance of Swearing and Cursing

One study found that males are more likely than females to tolerate or feel comfortable in the company of others who engage in swearing and cursing (Table 6.3.6.11).

Table 6.3.6.11. Tolerance of swearing and cursing.

Nature of Any Difference	Prepubertal	Postpubertal
	Childhood	Adolescent
Males more	**EUROPE** *Britain*: Powell & Stewart 1978:310*	**EUROPE** *Britain*: Powell & Stewart 1978:310*
No signif. difference		
Females more		

6.3.7. Attitudes Toward Health Issues

Studies of gender differences in attitudes toward health-related topics are explored in the following subsection.

6.3.7.1. Attitude Toward Exercise

Table 6.3.7.1 shows that males have more favorable attitudes toward and/or preference for exercise than do females.

Table 6.3.7.1. Attitude toward exercise.

Nature of Any Difference	Prepubertal	Postpubertal
	Childhood	Adult
Males more positive	**NORTH AMERICA** *United States*: Haladyna & Thomas 1979	**EUROPE** *Britain*: Bhui & Fletcher 2000:30 (longer duration) **NORTH AMERICA** *United States*: Lewinsohn et al. 2002 (young)
No signif. difference		
Females more positive		

6.3.7.2. Attitudes Toward Health Issues

According to two studies, females have more positive attitudes toward health issues than do males (Table 6.3.7.2).

Table 6.3.7.2. Attitude toward health issues.

Nature of Any Difference	Postpubertal	
	Adolescent	Adult
Males more positive		
No signif. difference		
Females more positive	**NORTH AMERICA** *United States*: D Gould et al. 1985 (swimming youths)	**NORTH AMERICA** *United States*: Schulman & Karney 2003 (medical school, nutritional & healthy eating)

6.3.7.3. Health Consciousness Attitudes Regarding Eating

As shown in Table 6.3.7.3, all available studies have concluded that females consider themselves to be more health conscious concerning what they eat than do males.

Table 6.3.7.3. Health consciousness attitudes regarding eating.

Nature of Any Difference	Postpubertal	Postpubertal Combined
	Adult	
Males more positive		
No signif. difference		
Females more positive	**EUROPE** *Britain*: Furnham & Kirkaldy 1997 (toward eating healthy); *Ireland*: Kearney et al. 2001 (toward eating healthy); *Several European Countries*: Lennernas et al. 1997 (toward eating healthy) **NORTH AMERICA** *United States*: Courtenay et al. 2002 (toward eating healthy) **INTERNATIONAL** *Multiple Countries*: Steptoe et al. 1995 (toward eating healthy)	**NORTH AMERICA** *United States*: K Dean 1989 (toward eating healthy); Rolls et al. 1991 (toward dieting and eating low calorie foods); Fagerli & Wandel 1999 (toward dieting and eating low calorie foods)

6.3.8. Attitudes toward Political Issues

Research findings regarding gender differences in attitudes toward political issues are presented below.

6.3.8.1. Having Opinions Concerning Political Issues

Table 6.3.8.1 shows that males have been shown to have stronger opinions concerning political issues than do females.

Table 6.3.8.1. Having opinions concerning political issues.

Nature of Any Dif-ference	Postpubertal	Multiple Age Categories
	Adult	
Males more	**NORTH AMERICA** *United States*: RB Rapoport 1982; Krosnick & Milburn 1990	**NORTH AMERICA** *United States*: Cantril 1944; Almond 1950; Cantril & Strunk 1951 (public opinion); Erskine 1970; RB Rapoport 1982; T Smith 1984; RB Rapoport 1985; Fite et al. 1990; J Clark & Clark 1993
No signif. difference		
Females more		

6.3.8.2. Attitude Toward Abortion Rights/Availability

Attitudes toward abortion are roughly divided between those who believe that women who become pregnant should be allowed to decide whether or not to continue the pregnancy and those who believe that pregnancies should not be terminated except under rare conditions, such as when the life of the mother is threatened. The available research on these attitudes is summarized in Table 6.3.8.2. It indicates that while sex differences in these attitudes are minimal, most studies have found a slightly greater proportion of men favor a woman's right to have an elective abortion than do women themselves (Welch & Thomas 1988). If gender differences do exist, they may depend on exactly how questions are worded and the response options provided to the subjects.

Table 6.3.8.2. Attitude toward abortion rights/availability.

Nature of Any Dif-ference	Postpubertal	Multiple Age Categories
	Adult	
Males more supportive (pro-choice)	**EUROPE** *Britain*: S Welch & Thomas 1988:34 **NORTH AMERICA** *United States*: Arney & Trescher 1976; Tedrow & Mahoney 1979; RY Shapiro & Mahajan 1986; Craig & O'Brien 1993	**NORTH AMERICA** *Canada*: B O'Neill 2001:283
No signif. difference	**EUROPE** *Britain*: Baluch et al. 1994 (college) **NORTH AMERICA** *United States*: Barnartt & Harris 1982; Benin 1985; Granberg & Granberg 1985 (college); Secret 1987; AS Rossi & Sitaraman 1988; Cook et al. 1992; Ladd & Bowman1997 (males more ambivalent, females more extreme on both ends); Misra & Panigrahi 1998; Edlund & Pande 2002:933; Strickler & Danigelis 2002:197 **INTERNATIONAL** *Multiple Countries*: RJ Simon 1998	**NORTH AMERICA** *United States*: Maguire & Pastore 1996:219
Females more supportive (pro-choice)	**EUROPE** *Britain*: Jelen et al. 1994:180*; *Italy*: Jelen et al. 1994:180* **NORTH AMERICA** *United States*: Bolks et al. 2000:257 (Latino National Political Survey)	

6.3.8.3. Attitude Toward Censorship

The one available study of gender differences in attitudes toward government censorship found more female than male support (Table 6.3.8.3).

Table 6.3.8.3. Attitude toward censorship.

Nature of Any Dif-ference	Postpubertal
	Adult
Males more supportive	
No signif. difference	
Females more supportive	**EUROPE** *Britain*: Jelen et al. 1994:179 (necessity of some censorship)

6.3.8.4. Attitude Toward/Support for Clitorectomies (Female Genital Mutilation)

In a number of African and Middle Eastern countries, girls have genital operations usually shortly before the onset of puberty. The most common explanation for this practice is that it helps to reduce sexual pleasure and therefore discourages premarital sex. The available studies of sex differences in attitudes toward this practice all suggest that females express stronger support for this custom than do males (Table 6.3.8.4).

Table 6.3.8.4. Attitude toward/support for clitorectomies (female genital mutilation).

Nature of Any Dif-ference						Postpubertal
						Adult
Males more supportive						
No signif. difference						
Females more supportive						**AFRICA** *Northern Africa*: Lightfoot-Klein 1989; EK Hicks 1996; *Sudan*: Boddy 1989

6.3.8.5. Attitude Toward Environmental Issues/ Environmental Conservation

Most research undertaken to determine if males or females are more concerned with the state of the environment or supportive of conservation has concluded that females have a keener interest and concern than do males (Table 6.3.8.5).

Table 6.3.8.5. Attitude toward environmental issues/environmental conservation.

Nature of Any Dif-ference						Postpubertal	Multiple Age Categories
						Adult	
Males more supportive						**NORTH AMERICA** *United States*: Arcury et al. 1987 (college, acid rain); WL MacDonald & Hara 1994 (college)	
No signif. difference							**INTERNATIONAL** *Multiple Countries*: Hayes 2001
Females more supportive						**EUROPE** *Britain*: S Welch & Thomas 1988 (liberal) **NORTH AMERICA** *Canada*: M Wilson et al. 1996 (college); *United States*: Passino & Lounsbury 1976; Van Liere & Dunlap 1980; Nelkin 1981; McStay & Dunlap 1983; CJ Brody 1984 (nuclear power); LC Hamilton 1985 (toxic waste); Blocker & Eckberg 1989; Steger & Witt 1989; Mohai 1992 (more supportive but less active in environmental movements); Wright & Floyd 1992; PC Stern et al. 1993; D Scott & Willits 1994; Ozanne et al. 1999* **OCEANIA** *New Zealand*: Ozanne et al. 1999*	**NORTH AMERICA** *United States*: RY Shapiro & Mahajan 1986

6.3.8.6. Attitude Toward Gambling (or Legalization of Gambling)

One study found that more males than females supported removing legal restrictions on gambling (Table 6.3.8.6).

Table 6.3.8.6. Attitude toward gambling (or legalization of gambling).

Nature of Any Dif-ference						Postpubertal
						Adult
Males more supportive						**NORTH AMERICA** *United States*: Gardiner 1970
No signif. difference						
Females more supportive						

6.3.8.7. Support for Lethal Methods for Controlling Wildlife Populations

Surveys among the general public have sought to determine people's attitudes toward the use of lethal methods for controlling excessive populations by certain wildlife species, most notably deer. People's concerns with deer have had to do with reducing deer-vehicle collisions, damage to crops, and the spread of contagious diseases (e.g., Lyme disease; Dougherty et al. 2003:604). Table 6.3.8.7 shows that males are more likely to favor killing as a solution to their becoming overly abundant in an area, whereas females are more likely to favor non-lethal methods such as contraception as well as taking no action at all.

Table 6.3.8.7. Support for lethal methods for controlling wildlife populations.

Nature of Any Dif-ference						Postpubertal
						Adult
Males more supportive						**NORTH AMERICA** *United States*: Lauber et al. 2001; Zinn & Pierce 2002; Dougherty et al. 2003
No signif. difference						
Females more supportive						

6.3.8.8. Attitude Toward Nuclear Power

As shown in Table 6.3.8.8, one study found females expressing more favorable attitudes toward nuclear power than did males.

Table 6.3.8.8. Attitude toward nuclear power.

Nature of Any Difference							Multiple Age Categories
Males more favorable							
No signif. difference							
Females more favorable							**EUROPE** *Multiple Countries*: Jelen et al. 1994:180

6.3.8.9. Attitude Toward Income Inequality

Attitudes toward income inequality refer to people's support for governmental policies that either help to reduce income inequality (an egalitarian view) or do not attempt to interfere with such inequality (a laissez-faire view). As shown in Table 6.3.8.9, studies indicate that females have more egalitarian attitudes, meaning that they have less favorable attitudes toward income inequality, than do males.

Table 6.3.8.9. Attitude toward income inequality.

Nature of Any Dif-ference					Postpubertal	
					Adolescent	Adult
Males more egalitarian						
No signif. difference						
Females more egalitarian					**EUROPE** *Sweden*: Sidanius & Ekehammar 1980 (high school)	**NORTH AMERICA** *United States*: Sidanius & Pratto 1993:393 (young)

6.3.8.10. Attitude Toward Racism/Racial Inequality

The majority of studies shown in Table 6.3.8.10 indicate that females favor undertaking greater effort to achieve racial equality than do males.

Table 6.3.8.10. Attitude toward racism/racial equality.

Nature of Any Difference					Postpubertal	
					Adolescent	Adult
Males more egalitarian					**EUROPE** *Britain*: GE Powell & Stewart 1978	
No signif. difference						
Females more egalitarian					**EUROPE** *Britain*: Marjoribanks 1981; *Spain*: M Moya et al. 2000; *Sweden*: Sidanius & Ekehammar 1980 **NORTH AMERICA** *United States*: MK Johnson & Marini 1998; M Hughes & Tuch 2003 (White females more favorable attitude toward Black people) **INTERNATIONAL** *Multiple Countries*: Furnham 1985	**EUROPE** *Sweden*: Ekehammar 1985 (young) **NORTH AMERICA** *United States*: Sidanius et al. 1991 (college); RG Sands 1998 (college, favoring pro-diversity in college admission)

6.3.8.11. Attitude Toward Social Dominance

Social dominance has to do with groups tending to dominate over other groups (e.g., men over women, or one ethnic group over another). According to several studies, males are more inclined than females to express support for social dominance (Table 6.3.8.11).

Table 6.3.8.11. Attitude toward social dominance.

Nature of Any Dif-ference						Postpubertal
						Adult
Males more						**EUROPE** *France*: Dambrun et al. 2004 **NORTH AMERICA** *United States*: Sidanius et al. 1994b; Pratto et al. 1997 **OCEANIA** *Australia*: Heaven 1999; *New Zealand*: MS Wilson & Liu 2003:190 **INTERNATIONAL** *Multiple Countries*: Sidanius et al. 1995; Pratto et al. 2000; Sidanius et al. 2000
No signif. difference						
Females more						

6.3.8.12. Attitude Toward War/Peace

Males have been found to be more likely than females to favor warfare as a solution to international conflicts and to favor national defense and military armament expenditures (Table 6.3.8.12).

Table 6.3.8.12. Attitude toward war/peace.

Nature of Any Difference	Prepubertal			Postpubertal		Multiple Age Categories
			Childhood	Adolescent	Adult	
Males more pro-war/anti-peace			**EUROPE** *Finland*: Wahlstrom 1985	**NORTH AMERICA** *Canada***:** Covell 1996*; *United States*: P Cooper 1965; Schroeder et al. 1993; Roscoe et al. 1988; Covell 1996	**EUROPE** *Britain*: S Welch & Thomas 1988:35* **NORTH AMERICA** *United States*: N Lynn 1975; Lunch & Sperlich 1979; Holsti & Rosenau 1981 (military force in foreign policy disputes); Frankovich 1982 (military response); S Baxter & Lansing 1983 (military force in foreign policy disputes); Goertzel 1983 (military); T Smith 1984; Zweigenhaft 1985; RY Shapiro & Mahajan 1986 (military response); MP Jensen 1987 (military force in foreign policy disputes); Fite et al. 1990 (military force in foreign policy disputes)	**EUROPE** *Denmark*: Faurby et al. 1986; Togeby 1994a:379; *Norway*: Hellevik et al. 1975; Valen 1981; Listhaug et al. 1985; *Sweden*: Elasser 1987; Holmberg & Gilljam 1987; Gilljam & Holmberg 1993; *Multiple Countries*: de Boer 1985 **NORTH AMERICA** *United States*: J Evans 1984; M Banks & Ullah 1987
No signif. difference						
Females more pro-war/anti-peace						

6.3.8.13. Attitude Toward Providing Welfare for the Disadvantaged

Research in North America has consistently shown that females express more favorable attitudes toward providing governmental assistance to the poor and disadvantaged than do males (Table 6.3.8.13).

Table 6.3.8.13. Attitude toward providing welfare for the disadvantaged.

Nature of Any Difference					Postpubertal		Multiple Age Categories
						Adult	
Males more							
No signif. difference						**EUROPE** *Britain*: S Welch & Thomas 1988:34 (nationalized welfare & health)	
Females more favorable						**NORTH AMERICA** *Canada*: Kopinak 1987; *United States*: Goertzel 1983 (military, help for disadvantaged); Shapiro & Mahajan 1986*; Gilens 1988; CK Chaney et al. 1998; LR Petersen & Donnenwerth 1998; C Clark & Clark 1999; LE Richardson & Freeman 2003:413	**NORTH AMERICA** *United States*: FL Cook 1979 (public welfare programs); RY Shapiro & Mahajan 1986*; Gilligan et al. 1988

6.3.8.14. Satisfaction With the Existing Political/Economic System

Satisfaction with the existing political and/or economic system (the status quo) is usually measured through self-report tests. As seen in Table 6.3.9.14, one study found males in several different countries were more satisfied with the existing political and economic system than were females in those countires.

Table 6.3.9.14. Satisfaction with the existing political/economic system.

Nature of Any Difference						Multiple Age Categories
Males more favorable						**INTERNATIONAL** *Multiple Countries*: G Marshall & Firth 1999:41 (10 countries)
No signif. difference						
Females more favorable						

6.3.9. Attitudes toward Quasi-Political Issues

Quasi-political issues, as the term is used here, have to do with issues that are often under some governmental regulation, although they are not usually considered central to governmental functioning. Findings concerning sex differences in these attitudes are summarized in the following subsection.

6.3.9.1. Attitude Toward Euthanasia

The available research indicates that males have more favorable or tolerant attitude toward euthanasia than do females (Table 6.3.9.1).

Table 6.3.9.1. Attitudes toward euthanasia.

Nature of Any Difference	Multiple Age Categories
Males more favorable	**NORTH AMERICA** *United States*: RA Ward 1980; Finlay 1985; Roper Organization 1990; J Holden 1993
No significant difference	
Females more favorable	

6.3.9.2. Attitude Toward Genetic Engineering and Cloning

Approval of genetic engineering and cloning has not been widely studied, but the one available study indicates that males were more approving or accepting of such scientific work than were females (Table 6.3.9.2).

Table 6.3.9.2. Attitude toward genetic engineering and cloning.

Nature of Any Difference	Postpubertal
	Adult
Males more favorable	**NORTH AMERICA** *United States*: Napoltano & Ogunseitan 1999
No signif. difference	
Females more favorable	

6.3.9.3. Attitude Toward Government Corruption

A limited amount of research indicates that males have more accepting attitudes toward government corruption than do females (Table 6.3.9.3).

Table 6.3.9.3. Attitude toward government corruption.

Nature of Any Difference	Multiple Age Categories
Males more accepting/tolerant	**LATIN AMERICA**: *Multiple Countries*: Jaquette 1994 **AFRICA** *Sierra Leone*: Kpundeh 1995
No signif. difference	
Females more accepting/tolerant	

6.3.9.4. Authoritarian/Anti-Authoritarian Attitudes

Authoritarian attitudes are usually measured by self-report tests. Table 6.3.9.4 suggests that males may have more authoritarian attitudes than females except during adolescence, when one study found no significant difference.

Table 6.3.9.4. Authoritarian/anti-authoritarian attitudes.

Nature of Any Difference	Postpubertal		Multiple Age Categories
	Adolescent	Adult	
Males more authoritarian		**EUROPE** *Britain*: Reicher & Emler 1985 (young) **OCEANIA** *Australia*: Heaven 1993:71 (young)	**NORTH AMERICA** *United States*: L Thompson & Walker 1989 (child's perception of parents)
No signif. difference	**NORTH AMERICA** *United States*: HJ Walberg 1969:49		
Females more authoritarian			

6.3.9.5. Social/Political Conservativeness

People who are social or political conservatives generally favor maintaining more traditional standards and rules of conduct. As shown in Table 6.3.9.5, research findings have not reached consistent conclusions regarding any sex differences in such attitudes.

Table 6.3.9.5. Social/political conservativeness.

Nature of Any Difference	Prepubertal				Postpubertal		Multiple Age Catagory
				Childhood	Adolescent	Adult	
Males more conservative					**EUROPE** *Sweden*: Ekehammar & Sidanius 1982	**NORTH AMERICA** *United States*: Kaufmann & Petrocik 1999 (among Republicans)	
No signif. difference				**EUROPE** *Britain*: Powell & Stewart 1978:309*			
Females more conservative					**EUROPE** *Britain*: Powell & Stewart 1978:309*	**NORTH AMERICA** *United States*: DeVaus & McAllister 1989 (before 1960, voting for Republican candidates); AH Miller & Lockerbie 1992:371 (before 1960, voting for Republican candidates)	**OCEANIA** *Australia*: Feather 1975:132; Feather 1977:81 (especially regarding religion)

6.3.10. Voting

Voting is an activity in which citizens elect governmental representatives. Three aspects of voting will be dealt with in the next four tables. One is the mere act of taking part in elections, the second has to do with tendencies to vote for left wing (liberal) or right wing (conservative) parties or candidates, and the third involves the tendency to vote for female, as opposed to strictly male, political candidates.

6.3.10.1. Voting in Elections

Several studies have assessed gender differences in tendencies to vote in public elections. According to nearly all of these studies, voting rates are higher among males than among females (Table 6.3.10.1). This may reflect a general tendency for men to be more interested and involved in politics, especially at national and international levels (Tiger 1970:127).

Table 6.3.10.1. Voting in elections.

Nature of Any Difference					Postpubertal		Multiple Age Categories
						Adult	
Males do so more						**MIDDLE EAST** *Israel*: Herzog 1999; Spiro 1979 **NORTH AMERICA** *United States*: Allardt 1958*; WE Miller 1966:88; Nixon 1966:135; Richmond-Abbot 1983:377* (presidential elections from 1948-1968)	**ASIA** *India*: S Gleason 2001:113; *Japan*: O'Reilly 1983:69 **EUROPE** *Norway*: Allardt 1958*; Rokkan & Campbell 1966:440 **NORTH AMERICA** *United States*: A Campbell et al. 1960:258; Verba & Nie 1972:97
No signif. difference						**NORTH AMERICA** *United States*: Richmond-Abbot 1983:377* (presidential elections from 1972-1976)	
Females do so more							**NORTH AMERICA** *United* States: Hedlund et al. 1979

6.3.10.2. Voting Left-Wing (Liberal) or Expressing a Preference for Left-Wing Political Views

Measured via self-reports, voting for liberal candidates or left-wing parties has been found to be more prevalent among females than among males. This holds true for college students as well as for older people, and has been noted in many Western countries with only a few exceptions (Table 6.3.10.2). Most of the exceptions were in the United States in elections occurring prior to the 1960s, when greater proportions of women than men voted for Republican (conservative) candidates. Since the 1960s, more women have supported Democratic candidates than Republican candidates, with the gap gradually growing larger (Edlund & Pande 2002:918). These gender differences appear to be more pronounced among younger rather than older voters (Seltzer et al. 1997:53; Aldrich & Kage 2003).

Table 6.3.10.2. Voting left-wing (liberal) or expressing left-wing political views.

Nature of Any Difference	Postpubertal		Multiple Age Categories
	Adolescent	Adult	
Males more	**OCEANIA** *Hawaii*: PM Symonds 1925	**EUROPE** *Britain*: Pulzer 1967:52; D Butler & Stokes 1974:160 **NORTH AMERICA** *United States*: AP Campbell et al. 1960:493; Lipset 1960:143 **INTERNATIONAL** *6/7 Industrial Countries*: Inglehart 1977:228*; *Several Western Countries*: Duverger 1955:65	**NORTH AMERICA** *United States*: Almond & Verba 1963; Edlund & Pande 2002:917* (in the 1950s)
No signif. difference		**EUROPE** *Britain*: A Heath et al. 1985*; Norris 1988; S Welch & Thomas 1988:33; *Norway*: Oskarson 1995 **NORTH AMERICA** *Canada*: Erickson & O'Neill 2002 (mixed results by region & time periods); *United States*: Studlar et al. 1998*; Trevor 1999; Inglehart & Norris 2000:445* (vote democratic from 1960 through 1976) **INTERNATIONAL** *10/35 Multiple Countries*: Inglehart & Norris 2000:449*	**EUROPE** *Czech Republic*: Mateju 1999:27
Females more	**EUROPE** *Britain*: Marjoribanks 1981; Furnham 1985 **NORTH AMERICA** *United States*: Emihovich & Gaier 1983	**EUROPE** *Britain*: A Heath et al. 1985:23*; R Rose & McAllister 1986; Kenski 1988; R Rose & McAllister 1990:51; BC Hayes 1997; *Germany*: Rusciano 1992; *Netherlands*: L Mayer & Smith 1995*; *Sweden*: Sidanius & Ekehammar 1980:23 (college); Ekehammar & Sidanius 1982 (college); Ekehammar 1985 (college); *Several Countries*: L Mayer & Smith 1995; Jelen et al. 1994; Inglehart & Norris 2000* **NORTH AMERICA** *Canada*: Kopinak 1987; *United States*: Frankovic 1982 (after 1972); S Baxter & Lansing 1983*; E Klein 1984; Bolce 1985; E Klein 1985; Wirls 1986; Asher 1988:188 (after 1972); A Miller 1988; HW Stone 1989 (young, ministry students); EC Ladd 1992 (after 1972); S Welch & Hibbing 1992; Pomper 1993:138 (after 1972); Bendyna & Lake 1994; Burrell 1994 (after 1972); Sapiro & Conover 1997; RJ Seltzer et al. 1997; CK Chaney et al. 1998; Studlar et al. 1998*; Inglehart & Norris 2000:445* (vote democratic from 1980 through 1996); Kaufmann & Petrocik 1999; Matteil 2000:202 **OCEANIA** *New Zealand*: Vowles 1993 **INTERNATIONAL** *1/7 Industrial Countries*: Inglehart 1977:228*; *13/35 Multiple Countries*: Inglehart & Norris 2000:449* (more liberal)	**EUROPE** *Denmark*: Togeby 1994b; *Multiple Countries*: NJ Walker 1988 (Britain, Germany, France) **NORTH AMERICA** *United States*: Pomper 1975; Pomper et al. 1981; Riddidough 1981; Frankovic 1982; V Randall 1982; S Baxter & Lansing 1983*; Goertzel 1983; V Sapiro 1983; EC Ladd 1985; M Nelson 1985; Poole & Zeigler 1985; Basow 1986; AH Miller 1986; RY Shapiro & Mahajan 1986; Deitch 1988; Gilens 1988; Pomper et al. 1989; PR Abramson et al. 1990; Eisenman & Sirgo 1991; Edelman 1993:33; Eisenman & Sirgo 1994 (making political contributions); S Stark 1996; Seltzer et al. 1997; Norrander 1999; Edlund & Pande 2002:918* (1960-1996); Norrander 2003 **OCEANIA** *New Zealand*: Lamare 1989

6.3.10.3. Voting for Female, as Opposed to Male, Political Candidates

Studies that have sought to determine if a sex difference exists in the tendency to vote for female or male candidates have all concluded that females are more likely to do so (Table 6.3.10.3).

Table 6.3.10.3. Voting for female, as opposed to male, political candidates.

Nature of Any Difference	Postpubertal
	Adult
Males more	
No signif. difference	
Females more	**NORTH AMERICA** *United States:* Zipp & Plutzer 1985; Plutzer & Zipp 1996; RA Seltzer et al. 1997

6.3.10.4. Factors Affecting Voting

A few studies have sought to determine the types of issues that are most likely to affect whether men or women will shift their voting patterns. As shown in Table 6.3.10.4, there seems to be a tendency for men to be more impacted by macro-economic issues and by broad ideological issues when compared to women.

Table 6.3.10.4. Factors affecting voting.

Nature of Any Difference	Postpubertal
	Adult
Males more	**NORTH AMERICA** *United States*: RY Shapiro & Mahajan 1986* (macro-economic issues); CK Chaney et al. 1998* (ideology driven); LE Richardson & Freeman 2003* (ideology driven)
No signif. difference	
Females more	**NORTH AMERICA** *United States*: RY Shapiro & Mahajan 1986* (micro-economic issues); CK Chaney et al. 1998* (issue driven); LE Richardson & Freeman 2003* (issue driven)

6.3.11. Attitudes Toward Alcohol and Drug Use

People have varying opinions regarding the availability and use of various drugs, especially those that have a tendency to be often abused. Sex differences in these attitudes are summarized below.

6.3.11.1. Attitude Toward Alcohol Use

Two studies (identified in Table 6.3.11.1) have indicated that men have more positive (tolerant) attitudes toward the consumption of alcohol than do women.

Table 6.3.11.1. Attitude toward alcohol use.

Nature of Any Difference	Postpubertal
	Adult
Males more positive	**NORTH AMERICA** *Canada*: Legge & Sherlock 1990-91 (Indo-Pakistanis); Svenson et al. 1994 (college); Kunz & Giesbrecht 1999 (Indo-Pakistanis)
No signif. difference	
Females more positive	

6.3.11.2. Attitude Toward Legalized Drug Use

One study concluded that males were more supportive than females of making the use of currently illegal drugs legal (Table 6.3.11.2).

Table 6.3.11.2. Attitude toward legalized drug use.

Nature of Any Difference	Postpubertal
	Adolescent
Males more supportive	**NORTH AMERICA** *United States*: Rienzi et al. 1996
No signif. difference	
Females more supportive	

6.3.11.3. Attitude Toward Legalizing Marijuana

One study concluded that males are more likely to favor legalization of the possession of marijuana than are females (Table 6.3.11.3).

Table 6.3.11.3. Attitude toward legalizing of marijuana.

Nature of Any Difference	Multiple Age Categories
Males more positive	**NORTH AMERICA** *United States*: Maguire & Pastore 1996:219
No signif. difference	
Females more positive	

6.3.12. Attitudes Regarding Aggression, Crime & Punishment

Studies undertaken to determine sex differences in attitudes toward aggressive behavior and toward crime and the punishment of crime are summarized in the following subsection.

6.3.12.1. Attitude Toward Aggression and Aggressive Play

One study of sex differences in attitudes toward aggressive play indicated that boys were more supportive or at least accepting of it than were girls (Table 6.3.12.1).

Table 6.3.12.1. Attitude toward aggression and aggressive play.

Nature of Any Difference	Prepubertal
	Childhood
Males more tolerant/supportive	**NORTH AMERICA** *United States*: Huesmann et al. 1992
No signif. difference	
Females more tolerant/supportive	

6.3.12.2. Attitude Toward Crime (Other Than Rape) and Criminality

Studies of attitudes toward crime in general have not reached consistent conclusions regarding any sex differences (Table 6.3.12.2).

Table 6.3.12.2. Attitude toward crime (other than rape) and criminality.

Nature of Any Difference					Postpubertal	
					Adolescent	Adult
Males more					**EUROPE** *Britain*: GE Powell & Stewart 1978	**ASIA** *Russia*: Palesh et al. 2004 (college, violation of privacy and copyright on the Internet)
No signif. difference						
Females more					**NORTH AMERICA** *United States*: FJ McDonald 1963	**NORTH AMERICA** *United States*: BK Applegate et al. 2002

6.3.12.3. Attitude Toward Harshness of Criminal Penalties (Except Death Penalty)

Studies cited in Table 6.3.12.3 present a mixed picture regarding any sex difference in the tendencies to favor harsher penalties for crime, at least in adulthood.

Table 6.3.12.3. Attitude toward harshness of criminal penalties (except death penalty).

Nature of Any Difference	Prepubertal				Postpubertal	
				Childhood	Adolescent	Adult
Males favor harsher punishment				**EUROPE** *Britain*: Powell & Stewart 1978:316* (rule violators)	**EUROPE** *Britain*: Powell & Stewart 1978:316* (rule violators)	**NORTH AMERICA** *Canada*: Sprott 1999; *United States*: Blumstein & Cohen 1980; Grasmick & McGill 1994; BK Applegate et al. 2002
No signif. difference						**NORTH AMERICA** *Canada*: Ouimet & Coyle 1991; *United States*: Kritzer & Uhlman 1977 (judges); Warr & Stafford 1984; Myers & Talarico 1987 (judges); Spohn 1990 (judges); Lavacca & Kayson 1992 (college, simulated trial, sentence for a murder); Grasmick et al. 1993; McCorkle 1993 (rehabilitation efforts); B Johnson 1994 (rehabilitation efforts); Applegate et al. 1996; Haghighi & Lopez 1998 (rehabilitation efforts); Hurwitz & Smithey 1998 (rehabilitation efforts); Halim & Stiles 2001 **OCEANIA** *Australia*: Singh & Jayewardene 1978
Females favor harsher punishment						**NORTH AMERICA** *United States*: Gruhl et al. 1981 (judges, harsher sentences); Cullen et al. 1982 (rehabilitation efforts); Cullen et al. 1985 (rehabilitation efforts); Langworthy & Whitehead 1986; Farnworth et al. 1996; D Steffensmeier & Hebert 1999 (judges, harsher sentences)

6.3.12.4. Attitude Toward the Death Penalty

As shown in Table 6.3.12.4, when compared to females, males have been consistently shown to favor using the death penalty to punish violent crimes.

Table 6.3.12.4. Attitude toward the death penalty.

Nature of Any Dif-ference					Postpubertal	
						Adult
Males more approving						**EUROPE** *Britain*: S Welch & Thomas 1988:35 **NORTH AMERICA** *United States*: Warr & Stafford 1984; Skovron et al. 1989; Zeisel & Gallup 1989; Bohm 1991; Keil & Vito 1991; Grasmick et al. 1993; Barkan & Cohn 1994 (young); Sandys & McGarrell 1995; Farnworth et al. 1996; JT Whitehead & Blankenship 2000; Halim & Stiles 2001 **OCEANIA** *Australia*: Kelley & Braithwaite 1990
No signif. difference						
Females more approving						

6.3.13. Academic/Scholarly Attitudes

Sex differences in attitudes having to do with academic and scholarly issues are reviewed below.

6.3.13.1. Rating Given to Teaching Quality

In the United States, a widespread practice since the 1960s has been for college students to rate their instructors and the course regarding various aspects of its quality. Comparisons of the average ratings given by males and females have revealed that females generally give instructors of both sexes higher ratings (Table 6.3.13.1).

Table 6.3.13.1. Rating given to teaching quality.

Nature of Any Difference	Postpubertal
	Young Adult (college students)
Males rate teachers higher	
No signif. difference	**NORTH AMERICA** *United States*: Lovell & Haner 1955; Caffrey 1969
Females rate teachers higher	**EUROPE** *Spain*: J Fernandez & Mateo 1997:2001 (college) **NORTH AMERICA** *United States*: Quereski & Widlak 1973; Elmore & LaPointe 1974; Ashton 1975; Pohlman 1975

6.3.13.2. Attitude Toward Language and Communication Subject Areas

According to studies cited in Table 6.3.13.2, nearly all research has shown that females have more favorable attitudes toward the study of language and communications.

Table 6.3.13.2. Attitude toward language and communication subject areas.

Nature of Any Difference	Prepubertal	Postpubertal
	Childhood	Adolescent
Males more positive		
No signif. difference	**NORTH AMERICA** *United States*: Columba 1926* (reading, Catholic school)	
Females more positive	**EUROPE** *Britain*: D Hendley et al. 1995 (reading and writing) **NORTH AMERICA** *United States*: Columba 1926* (Catholic school, spelling)	**NORTH AMERICA** *United States*: Book 1922 (English and foreign languages); Colvin & MacPhail 1924 (English and foreign languages); GM Blair 1938 (English); JA Hicks & Hayes 1938 (young, English and foreign languages) **OCEANIA** *Hawaii*: Livesay 1942 (English and foreign language)

6.3.13.3. Attitude Toward Math

Limited research has found that males consider math to be more interesting and enjoyable than do females (Table 6.3.13.3).

Table 6.3.13.3. Attitude toward math.

Nature of Any Difference	Prepubertal	Postpubertal
	Childhood	Adolescent
Considered more interesting by males	**EUROPE** *Britain*: A Hendley et al. 1995 **NORTH AMERICA** *United States*: Columba 1926 (Catholic school)	**MIDDLE EAST** *Israel*: Lewy & Chalfon 1973; Dar 1974 **NORTH AMERICA** *United States*: Book 1922 (history); Colvin & MacPhail 1924; GM Blair 1938; JA Hicks & Hayes 1938 (young) **OCEANIA** *Hawaii*: Livesay 1942
No signif. difference		
Considered more interesting by females		

6.3.13.4. Attitude toward School/Teachers

The majority of studies shown in Table 6.3.13.4 indicate that females like school and teachers more than males.

Table 6.3.13.4. Attitude toward school/teachers.

Nature of Any Difference	Prepubertal	Postpubertal
	Childhood	Adolescent
Males like school/teachers more	**MIDDLE EAST** *Israel*: Schiff & Tatar 2003	
No signif. difference		
Females like school/teachers more	**NORTH AMERICA** *United States*: Birch & Ladd 1997; Howes et al. 2000	**NORTH AMERICA** *United States*: J Kleinfeld 1998; NH Falkner et al. 2001:37-38; BA Jacob 2002:595

6.3.13.5. Attitude Toward Science

With one exception, studies have found males exhibiting more positive attitudes toward science than is true for females (Table 6.3.13.5).

Table 6.3.13.5. Attitude toward science.

Nature of Any Difference	Prepubertal				Postpubertal	
				Childhood	Adolescent	Adult
Males more positive				**EUROPE** *Britain*: A Hendley et al. 1995	**NORTH AMERICA** *United States*: Book 1922 (history); Colvin & MacPhail 1924; GM Blair 1938; JA Hicks & Hayes 1938 (young); Terry & Baird 1997; Jovanovic & Dreves 1998 **OCEANIA** *Hawaii*: Livesay 1942	**NORTH AMERICA** *United States*: Kassinove & Ueckse 1991 (graduate students more accepting of science as a source of knowledge)
No signif. difference						
Females more positive					**EUROPE** *Britain*: F Mellor 2001 (physics)	

6.3.13.6. Attitudes Toward Social Science/Social Studies

At least during adolescence, males appear to have more favorable opinions of social science (including history) than do females (Table 6.3.13.6).

Table 6.3.13.6. Attitudes toward social science/social studies.

Nature of Any Difference					Postpubertal	
					Adolescent	
Males more positive				**NORTH AMERICA** *United States*: Columba 1926 (history, geography, in a Catholic school)	**NORTH AMERICA** *United States*: Book 1922 (history); Colvin & MacPhail 1924; GM Blair 1938; JA Hicks & Hayes 1938 (young) **OCEANIA** *Hawaii*: Livesay 1942	
No signif. difference						
Females more positive						

6.3.13.7. Attitudes Toward Religion Studies

One study of attitudes toward studying religion in school concluded that girls were more interested in doing so than were boys (Table 6.3.13.7).

Table 6.3.13.7. Attitudes toward religion studies.

Nature of Any Difference	Prepubertal					
				Childhood		
Males more favorable						
No signif. difference						
Females more favorable				**NORTH AMERICA** *United States*: Columba 1926 (Catholic school)		

6.3.14. Attitudes Concerning Science and Medicine

The available research on sex differences in attitudes surrounding science and medicine is summarized below.

6.3.14.1. Confidence in Physicians and Medicine

One study indicated that females expressed more confidence in physicians and in medicine than did males (Table 6.3.14.1).

Table 6.3.14.1. Confidence in physicians and medicine.

Nature of Any Difference					Postpubertal	
						Adult
Males more						
No signif. difference						
Females more						**NORTH AMERICA** *United States*: National Analysts Inc. 1972

6.3.14.2. Attitude Toward Health Care Coverage

According to one study, females were more likely than males to favor universal government funding of health care coverage (Table 6.3.14.2).

Table 6.3.14.2. Attitude toward health care coverage.

Nature of Any Difference	Postpubertal
	Adult
Males more	
No signif. difference	
Females more	**NORTH AMERICA** *United States*: RY Shapiro & Mahajan 1986 (promotion policies)

6.3.14.3. Attitudes Concerning the Nature/Nurture Controversy

Nature-nurture attitudes have to do with opinions regarding the importance of innate tendencies as opposed to learning when it comes to explaining human behavior. Table 6.3.14.3 suggests that either males tend to attribute greater importance to nurture (learning) or there are no significant differences in these opinions.

Table 6.3.14.3. Attitude concerning the nature/nurture controversy.

Nature of Any Difference	Prepubertal	Multiple Age Categories
	Childhood	
Males see nurture as more important	**NORTH AMERICA** *United States*: Pomerantz & Ruble 1997 (2nd to 5th grade students)	**EUROPE** *Britain*: Furnham et al. 1985:682 **OCEANIA** *Australia*: Nilson & Ekehammar 1989:364* (young adult)
No signif. difference		**EUROPE** *Portugal*: Faria & Fontaine 1997 (5th to 11th grade students); *Sweden*: Nilson & Ekehammar 1989:364* (young adult) **NORTH AMERICA** *United States*: Nilson & Ekehammar 1989:364* (young adult); Sanderson & Ellis 1992:37 (sociologists)
Females see nurture as more important		

6.3.15. Attitudes Surrounding Basic Social Relationships

Attitudes having to do with the family and other basic social relationships are reviewed in the following subsection.

6.3.15.1. Family-Related Attitude

A few studies have sought to determine if males or females are more likely to favor immediate family over extended family when opportunities to choose arise. One study among humans suggested that girls have more favorable attitudes toward family affiliation than do boys. Otherwise, two studies of nonhuman primates found females being more likely than males to take the side of a genetic relative when disputes arose (Table 6.3.15.1).

Table 6.3.15.1. Family-related attitude.

Nature of Any Difference	Postpubertal	Multiple Age Categories
	Adolescent	
Males more favorable		
No signif. difference		
Females more favorable	**MIDDLE EAST** *Israel*: Cinamon & Rich 2002 **NORTH AMERICA** *United States*: RM Smith 1963 (opinions of their parents); JF McDermott et al. 1983 (value family affiliation more)	**PRIMATE (EXCEPT APE)** *Rhesus Macaques*: Kaplan 1978 (more likely to defend kin when disputes erupt); IS Bernstein & Ehardt 1985 (more likely to defend kin when disputes erupt)

6.3.15.2. Attitudes Toward Female Participation in the Paid Work Force

Several studies have indicated that females have more favorable attitudes toward women combining work outside the home with a family life (Table 6.3.15.2).

Table 6.3.15.2. Attitudes toward female participation in the paid work force.

Nature of Any Difference					Postpubertal	
						Adult
Males more positive						
No signif. difference						
Females more positive						**NORTH AMERICA** *United States*: MW Osmond & Martin 1975; BS Roper & Labeff 1977; DM Zuckerman 1981 (college); Yoder et al. 1982; Thornton et al. 1983; Dubno 1985; WH McBroom 1987; K McKinney 1987 (college); Callan 1992; HM Lips 1992 (college, females ability to combine a career with family life); Serwinek 1992; Cassidy & Warren 1996 (college); Gowan & Trevino 1998 (college, Mexican-American)

6.3.15.3. Attitudes Toward Female Executives

Two studies were undertaken to determine if males or females had more negative attitudes toward female executives. Both concluded that males held more negative attitudes than did females (Table 6.3.15.3).

Table 6.3.15.3. Attitudes toward female executives.

Nature of Any Difference	Postpubertal	
		Adult
Males held more negative attitudes		**NORTH AMERICA** *United States*: Everett et al. 1996; Schminke 1997
No significant difference		
Females held more negative attitudes		

6.3.15.4. Attitude Toward Deserved Wages

Nearly all studies that have sought to determine how males or females differ in terms of their willingness to work for a given wage have found that males feel they warrant higher wages on average than do females (Table 6.3.15.4).

Table 6.3.15.4. Attitude toward deserved wages.

Nature of Any Difference	Prepubertal				Postpubertal	
				Childhood	Adolescent	Adult
Males believe they deserve more					**NORTH AMERICA** *United States*: Gasser et al. 1998*	**NORTH AMERICA** *Canada*: Desmarais & Curtis 2001:160; *United States*: Callahan-Levy & Messe 1979 (college); Reis & Jackson 1981 (college); B Major & Konar 1984; B Major et al. 1984b (college); BA Martin 1989 (college); McFarlin et al. 1989 (MBA graduate); Bylsma & Major 1992 (college); LA Jackson et al. 1992 (college)
No signif. difference						
Females believe they deserve more				**NORTH AMERICA** *United States*: Gasser et al. 1998*		

6.3.15.5. Attitude Toward Family and Child Issues

Two studies of legislators concluded that females have more favorable attitudes toward family and child welfare issues than is true for males (Table 6.3.15.5).

Table 6.3.15.5. Attitude toward family and child issues.

Nature of Any Difference					Postpubertal	
						Adult
Males more favorable						
No signif. difference						
Females more favorable						**EUROPE** *Britain*: S Thomas 1991 (legislators); S Thomas & Welch 1991 (legislators)

6.3.15.6. Attitude Toward Volunteer Work

According to one study, females have more favorable attitudes toward performing volunteer work than do males (Table 6.3.15.6).

Table 6.3.15.6. Attitude toward volunteer work.

Nature of Any Difference	Postpubertal
	Adult
Males more favorable	
No signif. difference	
Females more favorable	**NORTH AMERICA** *United States*: Fletcher & Major 2004 (Volunteer Functions Intentory)

6.3.16. Attitudes Pertaining to Religion

Research pertaining to sex differences in attitudes toward a variety of religious topics is covered in the following subsection.

6.3.16.1. Religiosity/Religiousness in General

General religiosity/religiousness pertains to the extent to which people consider religion important to their daily lives or have strong religious convictions. Measures of general religiosity are all based on self-reports. As shown in Table 6.3.16.1, the vast majority of studies have found females to consider themselves more religious than is the case for males.

Table 6.3.16.1. Religiosity/religiousness in general.

Nature of Any Difference	Prepubertal	Postpubertal		Multiple Age Categories
	Childhood	Adolescent	Adult	
Males more				
No signif. difference				
Females more	**ASIA** *Japan*: GD Wilson & Iwawaki 1980 **EUROPE** *Britain*: Nias 1973; GE Powell & Stewart 1978; Francis 1992; *Ireland*: Francis & Greer 1990:855*; Francis & Pearson 1991 **NORTH AMERICA** *United States*: Allport & Vernon 1931; Walberg 1969	**EUROPE** *Britain*: Furnham 1985:629; *Finland*: Helve 1991; *Ireland*: Francis & Stubbs 1987*; Francis 1989; Francis & Greer 1990:855*; *Scotland*: HM Gibson 1989; HM Gibson & Francis 1989; *Sweden*: Sidanius & Ekehammar 1980 **NORTH AMERICA** *United States*: M Donahue & Benson 1995 (S); V King et al. 1997:442 (rural)	**NORTH AMERICA** *United States*: Blazer & Palmore 1976 (elderly); Bengtson et al. 1977 (elderly); Brinkerhoff & MacKie 1985 (college students); DeVaus & McAllister 1987; Feltey & Poloma 1991 (young); Kassinove & Uecke 1991 (graduate students); AS Miller & Hoffmann 1995; BE Robinson et al. 1996:621; Holland 2002 (college) **OCEANIA** *Australia*: Jorm & Christensen 2004	**EUROPE** *Britain*: HJ Eysenck 1971:205; Francis & Stubbs 1987*; *Ireland*: CA Lewis & Maltby 1995:106 **NORTH AMERICA** *United States*: JS Levin et al. 1995a:S160 (Blacks); JS Levin et al. 1995b:167 (Blacks); Maltby et al. 1995:16; Ellison & Taylor 1996; Ferraro & Kelley-Moore 2000:224

6.3.16.2. Religious Faith, Intensity of

Several studies have asked males and females to rate the strength of their religious faith or convictions, nearly all of which have concluded that females provide higher estimates than do males (Table 6.3.16.2).

Table 6.3.16.2. Religious faith, intensity of.

Nature of Any Difference	Postpubertal		Multiple Age Categories
	Adolescent	Adult	
Males more			
No signif. difference		**OCEANIA** *Australia*: Hong & Grambower (young) 1986	
Females more	**ASIA** *Russia*: Zhuravlena & Peikova 1999:30* **EUROPE** *Finland*: Zhuravlena & Peikova 1999:30*	**AFRICA** *Nigeria*: Sijuwade 1994 (elderly) **NORTH AMERICA** *United States*: Diggory 1953 (young); RM Smith 1963 (young); Payne & Whittington 1976 (elderly); Petrowsky 1976 (elderly)	**NORTH AMERICA** *United States*: EK Strong 1943; McOrnwall 1988; T Walter & Davie 1998 **INTERNATIONAL** *Several Christian Countries*: Stark 2002:497*; *Several Non-Christian Countries*: Stark 2002:499*

6.3.16.3. Importance of Religion to One's Life (Religious Saliency)

Numerous studies have sought to determine if religion is more important to the lives of males or females. As shown in Table 6.3.16.3, nearly all research has concluded that it is more important to females than males.

Table 6.3.16.3. Importance of religion to one's life (religious saliency).

Nature of Any Difference	Prepubertal	Postpubertal		Multiple Age Categories
	Childhood	Adolescent	Adult	
Males more		**NORTH AMERICA** *United States*: Suziedelis & Potvin 1981 (Catholics)		
No signif. difference		**NORTH AMERICA** *United States*: G Gallup 1983		
Females more	**EUROPE** *Britain*: Powell & Stewart 1978:310*	**EUROPE** *Britain*: Powell & Stewart 1978:310* **NORTH AMERICA** *United States*: KE Hyde 1965; HJ Walberg 1969:49; Gannon 1970:502; PL Benson et al. 1983; PL Benson et al. 1987; M Donahue & Benson 1995	**EUROPE** *Britain*: M Argyle & Beit-Hallahmi 1975*; G Davie 1994; *Multiple Countries*: S Harding et al. 1986 **LATIN AMERICA** *Columbia*: Alzate 1978 (college) **NORTH AMERICA** *United States*: G Lenski 1953; Putney & Middleton 1961 (college); Back & Bourque 1970:493 (young); Sasaki 1979*; DeVaus & McAllister 1987; C Batson et al. 1989 (young); M Cornwall 1989; PS Richards 1991 (college); L Ellis & Wagemann 1993:229 (college); AS Miller & Hoffmann 1995; LJ Francis & Wilcox 1998; LR Petersen & Donnenwerth 1998; A Walsh 1998:124; PE Becker & Hofmeister 2001:711 **OCEANIA** *Australia*: I McAllister 1988	**ASIA** *Hong Kong*: Ho et al. 1998:469; *Korea*: GD Wilson & Lee 1974 **EUROPE** *Britain*: Argyle & Beit-Hallahmi 1975:71*; Francis et al. 1982 **NORTH AMERICA** *Canada*: Bibby 1987; *United States*: Lenski 1953; Sasaki 1979*; Caplow et al. 1983

6.3.16.4. Acceptance of Christian Doctrine

A few studies in predominantly Christian countries have sought to determine if a gender difference exists in terms of accepting Christian doctrine. These studies have all concluded that females are more likely to do so than are males (Table 6.3.16.4).

Table 6.3.16.4. Acceptance of Christian doctrine.

Nature of Any Difference	Postpubertal		Multiple Age Categories
	Adolescent	Adult	
Males more			
No signif. difference			
Females more	**EUROPE** *Britain*: Francis 1989	**EUROPE** *Britain*: DB O'Connor et al. 2003:213 (college, Francis Scale) **NORTH AMERICA** *United States*: C Clark & Clark 1999	**NORTH AMERICA** *United States*: Hoge et al. 1982:573

6.3.16.5. Being "Born Again"

The one study undertaken to assess gender differences in people's reporting having been "born again" Christians concluded that no significant difference between male and female existed (Table 6.3.16.5).

Table 6.3.16.5. Being "born again".

Nature of Any Difference	Multiple Age Categories
Males more	
No signif. difference	**NORTH AMERICA** *United States*: Edelman 1993:33 (19% of both sexes)
Females more	

6.4
SPECIFIC BELIEFS

Research findings having to do with sex differences in beliefs about various specific issues are the focus of the following section.

6.4.1. Beliefs of a Worldly Nature

The topics covered in this subsection have to do with people's beliefs pertaining to the nature of the empirical universe.

6.4.1.1. Belief About the Intelligence of Animals

The limited research on any male-female differences in ascribing mental states to nonhuman animals suggests that females scribe greater intelligence to nonhuman animals than do males (Table 6.4.1.1).

Table 6.4.1.1. Belief about the intelligence of animals.

Nature of Any Difference	Postpubertal
	Adult
Males ascribe more	
No signif. difference	
Females ascribe more	**ASIA** *Japan*: Nakajima et al. 2002* **NORTH AMERICA** *United States*: Herzog & Galvin 1997 (ascribing mental states to animals); Nakajima et al. 2002*

6.4.1.2. Belief About the Existence of Gender/Sex Discrimination

Two studies concluded that females were more certain of the existence of sex discrimination.

Table 6.4.1.2. Belief about the existence of gender/sex discrimination.

Nature of Any Difference	Postpubertal
	Adult
Males more	
No signif. difference	
Females more	**OCEANIA** *Australia*: Konrad & Spitz 1999; Konrad & Hartmann 2002

6.4.1.3. Belief About Self-Control of Future Health

Studies in both Europe and North America show that females are more likely to be concerned about their own control over their future health (Table 6.4.1.3).

Table 6.4.1.3. Belief about self-control of future health.

Nature of Any Difference	Multiple Age Categories
Males more	
No signif. Difference	
Females more	**EUROPE** *Britain*: Furnham & Kirkcaldy 1997 **NORTH AMERICA** *United States*: Verbrugge 1990

6.4.2. Beliefs of a Supernatural/Religious Nature

The subsection below provides a summary of studies of sex differences in people's beliefs about the supernatural and personal immortality.

6.4.2.1. Belief in God or a Supreme Being

To believe in God is to believe that some supernatural entity has unlimited power and controls the universe. This belief is measured through self-reports. As Table 6.4.2.1 indicates, most studies found that females have a stronger belief in God.

Table 6.4.2.1. Belief in God or a supreme being.

Nature of Any Difference					Postpubertal		Multiple Age Categories
					Adolescent	Adult	
Males more							
No signif. difference					**OCEANIA** *Australia*: Rigby & Densley 1984:726		
Females more					**EUROPE** *Ireland*: Greer 1971:100	**NORTH AMERICA** *United States*: Randall & Desrosiers 1980 (college)	**EUROPE** *Multiple Countries*: Jelen et al. 1994:179

6.4.2.2. Belief in Angels and Devils

Table 6.4.2.2 indicates that females are more likely to believe in angels and devils than are males.

Table 6.4.2.2. Belief in angels and devils.

Nature of Any Difference							Multiple Age Categories
Males More							
No signif. difference							
Females more							**NORTH AMERICA** *United States*: Sobal & Emmons 1982:10

6.4.2.3. Belief in Life After Death

According to one study, greater proportions of males believe in life after death (personal immortality) than do females (Table 6.4.2.3).

Table 6.4.2.3. Belief in life after death.

Nature of Any Difference					Postpubertal		
						Adult	
Males more						**NORTH AMERICA** *United States*: Vitulli & Luper 1998 (after a psychology college class)	
No signif. difference							
Females more							

6.4.2.4. Belief in Reincarnation

One study was located pertaining to the belief in reincarnation (life in another form after death). It indicated that females were more likely to hold such a belief than males (Table 6.4.2.4).

Table 6.4.2.4. Belief in reincarnation.

Nature of Any Difference					Postpubertal		
						Adult	
Males more							
No signif. difference							
Females more						**NORTH AMERICA** *United States*: T Gray 1990b:187 (college)	

6.4.2.5. Belief in Psychic Healing or Faith Healing

Table 6.4.2.5 shows that one study found females believing in psychic or faith healing more than did males.

Table 6.4.2.5. Belief in psychic healing or faith healing.

Nature of Any Difference					Postpubertal		
						Adult	
Males more							
No signif. difference							
Females more						**NORTH AMERICA** *United States*: T Gray 1990b:187 (college)	

6.4.2.6. Belief in Sorcery Versus Will of God

Table 6.4.2.6 suggests that females are more likely than males to attribute ill health and misfortune to sorcery (whereas males attribute the same events to the will of God more).

Table 6.4.2.6. Belief in sorcery versus will of God.

Nature of Any Difference	Postpubertal
	Adult
Males more	
No signif. difference	
Females more	**MIDDLE EAST** *Israel*: Bar-Zvi 1988 (Bedouin of Negev); Al-Krenawi 1999 (adult mental patients, Bedouin of Negev)

6.4.3. Other Worldly/Psychic/Superstitious Beliefs

Sex differences in beliefs about such things as the existence of alien life and the ability to control or foresee future events are explored in the following subsection.

6.4.3.1. Superstitious Beliefs in General

Superstitious beliefs are those that have minimal empirical foundation, often based on rumor or random experiences. As shown in Table 6.4.3.1, studies have consistently concluded that females harbor more superstitious beliefs than do males.

Table 6.4.3.1. Superstitious beliefs in general.

Nature of Any Difference	Postpubertal	
	Adolescent	Adult
Males more		
No signif. difference		
Females more	**NORTH AMERICA** *United States*: Lundeen & Caldwell 1930 (high school); Maller & Lundeen 1933 (high school)	**ASIA** *India*: Ramamurti & Januna 1987:156 (20-70 year olds) **NORTH AMERICA** *United States*: SH Blum & Blum 1974

6.4.3.2. Belief in Luck or Fate

Table 6.4.3.2 provides somewhat mixed results concerning any sex differences in beliefs about the role of luck and fate in people's lives.

Table 6.4.3.2. Belief in luck or fate.

Nature of Any Difference	Postpubertal
	Adult
Males more	
No signif. difference	**NORTH AMERICA** *United States*: JH Larson et al. 1994:82 (young)
Females more	**EUROPE** *Britain*: Summerfield & Youngman 1999 (college, fatalistic regarding received grades)

6.4.3.3. Belief in Hypnosis

Table 6.4.3.3 shows that one study found females exhibiting a stronger tendency to believe in hypnosis than males.

Table 6.4.3.3. Belief in hypnosis.

Nature of Any Difference	Postpubertal
	Adult
Males more	
No signif. difference	
Females more	**ASIA** *Singapore*: Otis & Kuo 1984:223 (college)

6.4.3.4. Belief in Astrology and Palm Reading

According to two studies, females are more inclined to believe in astrology and palm reading than are males (Table 6.4.3.4).

Table 6.4.3.4. Belief in astrology and palm reading.

Nature of Any Difference					Postpubertal
					Adult
Males more					
No signif. difference					
Females more					**NORTH AMERICA** *Canada*: Otis & Kuo 1984:223 (college); *United States*: T Gray 1990b:187 (college)

6.4.3.5. Belief in Extra Sensory Perception and Paranormal Phenomena

Belief in extra sensory perception and paranormal phenomena is a belief in the existence of perception that is unaccounted by ordinary senses (seeing, hearing, smelling, touching, etc.) and lacks a physical explanation. Studies that have sought to determine which gender has stronger beliefs in extra sensory perception and paranormal phenomena have yielded mixed results (Table 6.4.3.5).

Table 6.4.3.5. Belief in extra sensory perception and paranormal phenomena.

Nature of Any Difference				Postpubertal	Multiple Age Categories
				Adult	
Males more				**EUROPE** *Switzerland*: Brugger et al. 1993 (college) **NORTH AMERICA** *United States*: Vitulli & Luper 1998 (young); Vitulli et al. 1999 (young)	
No signif. difference				**NORTH AMERICA** *United States*: CA Salter & Routledge 1971 (college); Murphy & Lester 1976 (college); Wierzbicki 1985 (college); Vitulli & Luper 1998 (young, paranormal beliefs)	**NORTH AMERICA** *United States*: Irwin 1985
Females more				**NORTH AMERICA** *Canada*: T Gray 1990b (college); *United States*: Haraldsson 1981 (college); WS Messer & Griggs 1989:189 (college); Persinger & Richards 1991 (college); Vitulli et al. 1999 (elderly)	

6.4.3.6. Belief That Alien Life Forms Have Visited Earth

Self-reported beliefs regarding the existence of alien life forms on earth primarily include beliefs in unidentified flying objects (UFOs). Only one study is available on sex differences in such beliefs and, as shown in Table 6.4.3.6, it found significantly greater proportions of males expressing such beliefs than females.

Table 6.4.3.6. Belief that alien life forms have visited earth.

Nature of Any Difference					Postpubertal
					Adult
Males more					**NORTH AMERICA** *United States*: T Gray 1990b:187 (college)
No signif. difference					
Females more					

6.4.3.7. Having a Paranormal Experience

Table 6.4.3.7 shows that females may be more likely to have been in contact with a person who has died.

Table 6.4.3.7. Having a paranormal experience.

Nature of Any Difference					Postpubertal
					Adult
Males more					
No signif. difference					
Females more					**NORTH AMERICA** *United States*: Scheitle 2005 (in touch with the dead)

6.5
MORAL BELIEFS

Moral reasoning has to do with the acceptability/unacceptability of various courses of action, often regardless of the beneficial or harmful consequences to the person making the judgments. While it is hard to characterize all of the behavior that can be subsumed under the category of morality, most morality has to do with being kind and helpful to others.

6.5.1. Basic Moral/Ethical Reasoning

Despite its complexity and difficulty in measurement, morality is an extremely important aspect of human behavior. Findings of sex differences in how humans arrive at moral and ethical decisions are reviewed below.

6.5.1.1. Level/Stage in Moral Reasoning

Imagining a society in which most societal members were not guided by some basic moral principles is all but impossible. The idea that children think about moral issues in ways that can be distinguished from the reasoning processes used by most adults was first formulated by Piaget (1932). This view was later elaborated upon by Kohlberg (1969) in which he delineated six identifiable stages in moral reasoning. At the earliest or most basic stages, right and wrong are equated with what brings an individual pleasure or pain. At intermediate stages, right and wrong decisions are usually conceived of in terms of being dictated by authority figures (such as God, governmental officials, parents, or the law). The highest stages of moral reasoning, according to Kohlberg, are those based on an individual's own internal principles that have little or nothing to do with personal pleasure and pain or external authorities.

To measure the level at which individuals are reasoning about moral issues, subjects are usually asked a series of hypothetical questions surrounding moral dilemmas (Kohlberg 1984b; Colby & Kohlberg 1987). According to the developers of these scales, subjects typically reveal the level at which they are reasoning when they offer explanations for why they reached the decisions they made surrounding these dilemmas. In an alternative method of assessing people's varying levels of moral reasoning, subjects are given more realistic everyday-types of moral problems to solve and then asked to explain why they came to each decision (Armon 1998).

Table 6.5.1.1 shows that numerous studies have been undertaken to determine if males or females (of comparable age) reason about morality at the same or at different levels. The findings from these studies have largely converged on the conclusion that no significant gender difference exists. However, when gender differences have been found, females seem to reason at slightly higher levels through adolescents, but higher scores seem to be more prevalent among males in adulthood. Overall, this conclusion of essentially no significant gender difference is similar to one reached in a literature review of 22 studies by Rest (1986).

Table 6.5.1.1. Level/Stage in Moral Reasoning.

Nature of Any Difference	Prepubertal				Postpubertal		Multiple Age Categories
			Early Childhood	Childhood	Adolescent	Adult	
Males higher			**NORTH AMERICA** *United States*: Krebs 1967	**NORTH AMERICA** *United States*: LeFurgy & Woloshin 1969; Holstein 1976*	**NORTH AMERICA** *United States*: Lockwood 1970; Holstein 1976*; Baumrind 1986	**ASIA** *Korea*: JY Park & Johnson 1984 **NORTH AMERICA** *United States*: Haan et al. 1968 (young); Holstein 1969 (young); Haan et al. 1976 (young & middle age); Holstein 1976*; D Kuhn et al. 1977 (young); Bussey & Maughan 1982 (young)	**NORTH AMERICA** *United States*: Fishkin et al. 1973; Armon 1998* (Armor's test)
No signif. difference			**NORTH AMERICA** *United States*: Weisbroth 1970*; Keasey 1972; Blatt & Kohlberg 1975; Holstein 1976*	**ASIA** *Hong Kong*: Ma & Leung 1991 **EUROPE** *Britain*: A Simon & Ward 1973 **NORTH AMERICA** *United States*: Durkin 1960; Boehm & Nass 1962; Grinder 1964; Whiteman & Kosier 1964; EV Sullivan et al. 1970; Hebble 1971; Keasey 1972; JJ Taylor & Archenbach 1975; J Timm 1980; JC Gibbs et al. 1982*	**ASIA** *India*: Parikh 1980; Kracher et al. 2002 (moral reasoning) **AFRICA** *South Africa*: Maqsud 1998 **ASIA** *Hong Kong*: Ma & Chan 1987 **EUROPE** *Britain*: Hendry 1960; Eppel & Eppel 1966; *Greece*: Gielen et al. 1994; *Ireland*: Kahn 1982; *Wales*: Simon & Ward 1972 **MIDDLE EAST** *India*: Sahoo 1985; Vasudev & Hummel 1987; *Israel*: Snarey et al. 1985 **NORTH AMERICA** *Canada*: LJ Walker 1980; *United States*: Bielby & Papalia 1975*; FH Davidson 1976; Haan et al. 1976*; Holstein 1976*; Levine 1976; Turiel 1976*; Kavanagh 1977; Leming 1978; Haan 1978; GG Bear & Richards 1981; JC Gibbs et al. 1982*; RA Hanson & Mullis 1985 **OCEANIA** *Australia*: Musgrave 1984	**ASIA** *India*: Parikh 1980; *Korea*: JY Park & Lee 1982 (college) **MIDDLE EAST** *Israel*: Bar-Yam et al. 1980 (college); *Kuwait*: Al-Ansari 2002 (college) **NORTH AMERICA** *United States*: Snyder & Dunlap 1924 (young); Weisbroth 1970* (young & middle age); Haan 1974 (US Peace Corps volunteers); Arbuthnot 1975 (young); Froming 1978 (college); M Berkowitz et al. 1980 (young); Nassi 1981; JC Gibbs et al. 1982*; MW Pratt et al. 1984; Bar-Yam 1991 (young)	**AFRICA** *Kenya*: CP Edwards 1974 **ASIA** *Hong Kong*: Ma 1988:90*; *Japan*: Munekata & Ninomiya 1985 **EUROPE** *Britain*: Ma 1988:90* **MIDDLE EAST** *India*: RS Singh 1981 **NORTH AMERICA** *United States*: Bielby & Papalia 1975*; LZ Buck et al. 1981; Boldizar et al. 1989:236 (Kohlberg's test); Armon 1998* (Kohlberg's test)
Females higher			**NORTH AMERICA** *United States*: Turiel 1976:201*	**NORTH AMERICA** *United States*: Porteus & Johnson 1965; Turiel 1976:201*; Krebs & Gillmore 1982	**ASIA** *Taiwan*: Chiu 1990* **LATIN AMERICA** *Brazil*: Biaggio 1976 **MIDDLE EAST** *Israel*: Sagi & Eisikovits 1981 **NORTH AMERICA** *United States*: Saltzstein et al. 1972; Turiel 1976:203*; Chiu 1990*; Silberman & Snarey 1993		

6.5.1.2. Adopting a Caring Approach (vs. a Justice Approach) to Moral Reasoning

As noted in the above table, there appears to be no clear gender difference in terms of Kohlberg's *levels* of moral reasoning. Nevertheless, a gender difference has still been found in terms of *how* moral decisions are made. The nature of this difference began to be unearthed after a distinction was made in the 1980s between a *caring approach* to moral reasoning and a *justice approach* (C Gilligan 1982; C Gilligan & Attanucci 1988). At the core of a caring approach appears to be empathy, the tending to put oneself in the place of another human being and then making judgments as if one could personally feel the consequence of one's actions on others. A justice orientation, on the other hand, makes moral decisions by balancing the intentions behind an action with the reward or punishment that is appropriate for the outcome. According to Gilligan and those who have assisted her in pursuing this distinction, while males and females tend to reason at the same level, females employ a caring approach more than males, who use a justice approach more (CJ Woods 1996).

Many studies have sought to determine the merit of Gilligan's theorizing. As shown in Table 6.5.1.2, the vast majority of studies have confirmed her hypothesis that females adopt more of a caring moral orientation than males, and that males are more inclined toward a justice orientation, a conclusion also reached from a meta-analysis by Jaffee and Hyde (2000).

Table 6.5.1.2. Adopting a caring approach (vs. a justice approach) to moral reasoning.

Nature of Any Difference	Prepubertal				Postpubertal		Multiple Age Categories
				Childhood	Adolescent	Adult	
Males more							
No signif. difference				**NORTH AMERICA** *United States*: Eisenberg et al. 1987*	**EUROPE** *Norway*: Skoe et al. 1998*	**NORTH AMERICA** *United States*: Rothbart et al. 1986 (young); Galotti et al. 1991:19* (college)	**NORTH AMERICA** *United States*: CB White 1988; Clopton & Sorell 1993 (regarding close relatives)
Females more				**NORTH AMERICA** *United States*: Donenberg & Hoffman 1988	**NORTH AMERICA** *Canada*: Skoe et al. 1998*; *United States*: Yussen 1977; JC Gibbs et al. 1984; Eisenberg et al. 1987* (young); L Walker et al. 1987; N Eisenberg et al. 1989; Galotti et al. 1991:19*; Shoe et al. 1996; Badger et al. 1998*	**ASIA** *China*: Stander & Jensen 1993* (college) **NORTH AMERICA** *United States*: Lyons 1983* (young); Pratt et al. 1984 (young); MR Ford & Lowery 1986 (young); Langdale 1986 (young); Gilligan & Attanucci 1988 (college); Stiller 1990:59 (college); LC Jensen et al. 1991* (young & middle age); LC Jensen & Towle 1991 (young); M Pratt et al. 1991; D Stimpson et al. 1991 (young); Stander & Jensen 1993* (college); J White & Manolis 1997 (law students); Badger et al. 1998* (young); Skoe et al. 2002 (college) **INTERNATIONAL** *Multiple Countries*: D Stimpson et al. 1991	**NORTH AMERICA** *United States*: Lyons 1983*; Belenky et al. 1986; Pratt et al. 1988; Shoe & Gooden 1993; Bebeau & Brabeck 1994

6.5.1.3. Interpersonal Relational Aspects of Morality

The interpersonal relational aspects of morality has to do with giving special consideration to one's relationship to someone else in deciding how to behave toward them in moral and ethical terms. As shown in Table 6.5.1.3, females seem to weigh these relationships more than do males in moral decision-making.

Table 6.5.1.3. Interpersonal relational aspects of morality.

Nature of Any Difference					Postpubertal		
					Adolescent	Adult	
Males more concerned							
No signif. difference							
Females more concerned					**NORTH AMERICA** *United States*: Walker et al. 1987	**EUROPE** *Norway*: Skoe & Dilssner 1994 **NORTH AMERICA** *United States*: Pratt et al. 1991; Skoe et al. 2002:303 (college)	

6.5.1.4. Ethical Reasoning in Business Dealings

The data from the studies on behaving ethically in business dealings have come primarily from interviewing men and women who study or work directly in business. As one can see in Table 6.5.1.4, the findings have been more or less evenly split between concluding that no gender differences exist in business-related ethical reasoning and concluding that females have higher standards than do males.

Table 6.5.1.4. Ethical reasoning in business dealings.

Nature of Any Difference						Postpubertal	
						Adult	
Males more							
No signif. difference						**ASIA** *Singapore*: Delaney & Sockell 1992 (organizational behavior); Razzaque & Hwee 2002 (organizational behavior) **MIDDLE EAST** *Turkey*: Ekin & Tezolmez 1999 (business persons); Ergeneli & Arikan 2002:256 (salesperson) **NORTH AMERICA** *United States*: Hegarty & Sims 1978 (young, business ethics); J Browning & Zabriskie 1983 (wholesaler); Dubinsky & Ingram 1984 (retail sellers); McNichols & Zimmerer 1985 (young); Kidwell et al. 1987* (managers); Fritzsche 1988 (business managers); Singhapakdi & Vitell 1990; JR Davis & Walton 1991 (college, business majors); Stanga & Turpen 1991; Callan 1992 (young); Serwinek 1992 (small business owners)	
Females more						**NORTH AMERICA** *Canada*: Wahn 2003; *United States*: Beltramini et al. 1984 (college, business); Chonko & Hunt 1985 (young, self-report); Miesing & Preble 1985 (business); Kidwell et al. 1987*; Ferrell & Skinner 1988; Giacalone et al. 1988 (self-report); TM Jones & Gautschi 1988 (young); Akaah 1989 (marketing personnel); Arlow 1991 (college, business); Ruegger & King 1992 (college, business majors); Sims et al. 1996 (business); PL Smith & Oackely 1997 (college, business majors); Borkowski & Ugras 1998 (business students); Weeks et al. 1999 (business); Conroy & Emerson 2004 (business); Lawson 2004 (college, business)	

6.5.2. Other Moral Attitudes

A variety of morality-related attitudes are considered in the tables on sex differences which follow.

6.5.2.1. Relativity in Moral Reasoning

Two studies found that males were more relative/less absolutist in their moral reasoning (Table 6.5.2.1). In other words, males were more likely to reject rigid rules with no exceptions regarding how one should make moral decisions.

Table 6.5.2.1. Relativity in moral reasoning.

Nature of Any Difference	Postpubertal
	Adolescent
Males more	**EUROPE** *Estonia*: Keltikangas-Jarvinen et al. 1999:282*; *Finland*: Keltikangas-Jarvinen et al. 1999:282*
No signif. difference	
Females more	

6.5.2.2. Sympathetic Attitudes Toward Those Contemplating Suicide

Most of the available studies suggest that females are more sympathetic toward those who have or would contemplate suicide when compared to males (Table 6.5.2.2).

Table 6.5.2.2. Sympathetic attitudes toward those contemplating suicide.

Nature of Any Difference	Postpubertal	
	Adolescent	Adult
Males more sympathetic		
No signif. difference		**NORTH AMERICA** *United States*: Bell 1977 (college)
Females more sympathetic	**NORTH AMERICA** *United States*: Stillion et al. 1984a (suicide attempts); Stillion et al. 1984b; Stillion 1986	**NORTH AMERICA** *United States*: Leshem & Leshem 1976 (college); Wellman & Wellman 1986 (college); H White & Stillion 1988 (college)

6.5.2.3. Disapproving Attitude Toward Suicide

Findings have been mixed regarding the extent of disapproval toward those who would commit suicide or engage in euthanasia (Table 6.5.2.3). Nevertheless, even though most studies suggest that females are more sympathetic toward the contemplation of suicide (see table above), the present table suggests that when there are sex differences, females are more disapproving than males of the actual commission of suicide.

Table 6.5.2.3. Disapproving attitude toward suicide.

Nature of Any Dif-ference	Postpubertal	Multiple Age Categories
	Adult	
Males more disapproving		
No signif. difference	**NORTH AMERICA** *United States*: DE Bell 1977 (young) **OCEANIA** *New Zealand*: Beautrais et al. 2004 (young, suicide & euthanasia)	
Females more disapproving	**NORTH AMERICA** *United States*: Stack 1998 (young)	**NORTH AMERICA** *United States*: Deluty 1989; A Marks 1989

6.5.2.4. Belief in Allocating Pay According to Ability and Effort (Versus Equally)

When paying (or otherwise rewarding) people for work, various criteria can be used, including ability and effort. Other criteria include such things as need and equality. As shown in Table 6.5.2.4, in hypothetical circumstances described in questionnaires, males have been found to provide pay or other rewards according to someone's effort and ability to a greater extent than did females.

Table 6.5.2.4. Belief in allocating pay according to ability and effort (versus equally).

Nature of Any Difference	Postpubertal
	Adult
Males more	**NORTH AMERICA** *United States*: GS Leventhal & Lane 1970; IM Lane & Messe 1971; A Kahn 1972
No signif. difference	
Females more	

6.5.2.5. Belief in a Just World

So-called just world beliefs are those that people vary in their convictions that at least in the long run people who behave badly suffer more than they gain and those who behave properly are rewarded more than they are punished for doing so. As shown in Table 6.5.2.5, the evidence is inconsistent with respect to any gender difference in just world beliefs.

Table 6.5.2.5. Belief in a just world.

Nature of Any Difference					Postpubertal	Multiple Age Categories
					Adult	
Males more					**NORTH AMERICA** *United States*: Ambrosio & Sheehan 1990 (college)	
No signif. difference						
Females more						**EUROPE** *Britain*: Furnham & Rajamanickam 1992* **MIDDLE EAST** *India*: Furnham & Rajamanickam 1992*

6.5.2.6. Belief That Drunk Driving Is Wrong

The one available study comparing the sexes concerning their moral opinions regarding driving while drunk indicated that females considered such behavior as more immoral than did males (Table 6.5.2.6).

Table 6.5.2.6. Belief that drunk driving is wrong.

Nature of Any Difference					Postpubertal
					Adult
Males more					
No signif. difference					
Females more					**NORTH AMERICA** *United States*: Marelich et al. 2000:399

6.5.2.7. Concern About the Humane Treatment of Animals (Support for Animal Rights and Welfare)

Several studies have sought to determine if males or females are more supportive of laws and/or cultural practices that foster humane treatment of animals. Table 6.5.2.7 shows that these studies have all concluded that females express stronger support than do males.

Table 6.5.2.7. Concern about humane treatment of animals (support for animal rights and welfare).

Nature of Any Difference					Postpubertal	Multiple Age Categories
					Adult	
Males more						
No signif. difference						
Females more					**NORTH AMERICA** *United States*: Kellert & Berry 1987* (adult); Herzog et al. 1990 (young, college); Herzog et al. 1991; Richards & Krannick 1991; Galvin & Herzog 1992; WV Jamison & Lunch 1992; Pifer 1996 (young); CW Peek et al. 1997	**EUROPE** *Britain*: Elston 1987:267 (19th Century) **NORTH AMERICA** *United States*: Greanville & Moaa 1985; Kellert & Berry 1987*; GG Gallup & Beckstead 1988; Lauber & Knuth 1988b; S Sperling 1988; Westervelt 1988; Plous 1991; Driscoll 1992; JM Jasper & Nelkin 1992; Sanborn & Schmidt 1995; Kellert 1996; Peek et al. 1996; Einwohner 1999; Kruse 1999; Lauber et al. 2001:577

6.5.2.8. Willingness to Give Up Life for an Idea or Moral Principle

The study contained within Table 6.5.2.8 indicated that females are more willing to give up their lives for an idea or moral principle than males.

Table 6.5.2.8. Willing to give up life for an idea or moral principle.

Nature of Any Difference					Postpubertal
					Adult
Males more					
No signif. difference					
Females more					**NORTH AMERICA** *United States*: Shneidman 1971:78 (young)

Chapter 7

DRUG-, THERAPEUTIC-, AND STRESS-RELATED RESPONSES

The focus of this chapter is on gender differences in response to environmental variables. These variables primarily include responses to drugs that are consumed and stress that is experienced. Also examined are responses to treatments for physical and mental illnesses. Because most of the studies on responses to these environmental variables are based on controlled experiments, this chapter differs from all the chapters remaining in this book in the extent to which it is based on studies of nonhuman animals.

Chapter 7 begins with a section that considers sex differences in the effects of perinatal exposure to various drugs and then to perinatal stress. Following this is a section that examines how males and females respond to drugs following birth, with extensive coverage devoted to responses to alcohol. After exploring sex differences in responses to drugs, attention is given to non-drug types of therapies. The final major section of this chapter delves into sex differences in responses to stressful experiences following birth.

Even though the effects of drugs are covered extensively in this chapter, the actual consumption of drugs is not. Also not examined in this chapter are sex differences in feelings of stress in daily life, or in being administered various forms of therapies. Studies of these particular topics are covered in Chapters 9, 4, and 12, respectively.

7.1

PERINATAL EFFECTS OF DRUGS AND STRESS

Perinatal refers to the time during gestation and shortly following birth. Perinatal manipulations on animals can often be detected even in adulthood. To impose perinatal manipulations, mothers are often exposed to a drug or to stress with the understanding that whatever is introduced to the mother's blood supply will nearly always be transferred to the fetus. A second way to introduce an animal to perinatal manipulations involves noting that in some animals, particularly rodents, the offspring are typically born at an earlier developmental stage than is true for humans. Rats, for example, are born at a time that is roughly equivalent to the end of the second trimester in humans. This fact allows researchers to administer drugs directly to newborn rats within the first couple of weeks following birth as a way of studying the possible effects of those drugs on human fetuses during the last third of gestation.

7.1.1. Perinatal Alcohol Exposure Effects

Since the documentation of fetal alcohol syndrome in the offspring of many human mothers who drank heavily during pregnancy in the 1970s, numerous studies have investigated the phenomenon in a variety of species (Able 1984). Some of these studies have considered the possibility that males and females may differ in their vulnerability to the effects of perinatal alcohol exposure.

7.1.1.1. Perinatal Alcohol Exposure, Effects on the Anterior Commissure

In addition to the corpus callosum, the two cerebral hemispheres of the brain are connected by the anterior commissure. According to studies cited in Table 7.1.1.1, perinatal exposure to alcohol in rats leads to an equal degree of decrease in the size of the anterior commissure.

Table 7.1.1.1. Perinatal alcohol exposure, effects on the anterior commissure.

Nature of Any Difference	Prepubertal	Postpubertal
	Infant	Adult
Greater in males		
No signif. difference	**RODENT** *Rat*: Zimmerberg & Scalzi 1989 (analysis at P3, midline sagittal area)	**RODENT** *Rat*: Zimmerberg & Mickus 1990 (midline sagittal area)
Greater in females		

7.1.1.2. Perinatal Alcohol Exposure, Effects on Anxiety

According to one study of rats, perinatal exposure to alcohol leads to a greater degree of anxiety-related behaviors during exploration in females than in males (Table 7.1.1.2).

Table 7.1.1.2. Perinatal alcohol exposure, effects on anxiety.

Nature of Any Difference	Postpubertal
	Adult
Greater in males	
No signif. difference	
Greater in females	**RODENT** *Rat*: J Osborn et al. 1998: 685 (fear related behavior on elevated plus maze)

7.1.1.3. Perinatal Alcohol Exposure, Effects on Arginine Vasopressin

Perinatal exposure to alcohol, according to one study, appears to diminish the level of arginine vasopressin (AVP) in certain parts of the brain to essentially the same degree in males and females (Table 7.1.1.3).

Table 7.1.1.3. Perinatal alcohol exposure, effects on arginine vasopressin.

Nature of Any Difference	Postpubertal
	Adult
Greater in males	
No signif. difference	**RODENT** *Rat*: RF McGivern et al. 1998 (E14 exposure, in the septal/bed nucleus region)
Greater in females	

7.1.1.4. Perinatal Alcohol Exposure, Effects on Body Weight

Perinatal exposure to alcohol in rats decreases body weight gain in adulthood, but depending on the paradigm used, this change is either present in both sexes or is more pronounced in males (Table 7.1.1.4).

Table 7.1.1.4. Perinatal alcohol exposure, effects on body weight.

Nature of Any Difference	Postpubertal
	Adult
Greater in males	**RODENT** *Rat:* FE Lancaster & Speigel 1992
No signif. difference	**RODENT** *Rat:* Iimuro et al. 1997 (4 week intragastric feeding)
Greater in females	

7.1.1.5. Perinatal Alcohol Exposure, Effects on the Corpus Callosum

The corpus callosum is a part of the mammalian brain that connects the two cerebral hemispheres. As shown in Table 7.1.1.5, some studies have shown that perinatal exposure to alcohol in rats leads to a decrease in the size of these connecting fiber bundles in both sexes. By adulthood, the reduction in the size of the corpus callosum, but not the anterior commissure, is greater in males than in females.

Table 7.1.1.5. Perinatal alcohol exposure, effects on the corpus callosum.

Nature of Any Difference	Prepubertal	Postpubertal
	Infant	Adult
Larger in males		**RODENT** *Rat:* Zimmerberg & Mickus 1990
No signif. difference	**RODENT** *Rat*: Zimmerberg & Scalzi 1989 (P3 callosal area)	
Larger in females		

7.1.1.6. Perinatal Alcohol Exposure, Effects on the GABAergic Neurons

The one available study showed that perinatal exposure to alcohol in rats seemed to diminish the density of GABA-releasing neurons in the medial septum to a greater degree in females than males (Table 7.1.1.6).

Table 7.1.1.6. Perinatal alcohol exposure, effects on the GABAergic neurons.

Nature of Any Difference	Postpubertal
	Adult
Greater loss in males	
No signif. difference	
Greater loss in females	**RODENT** *Rat*: DB Moore et al. 1997 (E0-21 exposure, parvalbumin-expressing GABAergic neurons in the medial septum)

7.1.1.7. Perinatal Alcohol Exposure, Effects on the Heart

Perinatal exposure to alcohol leads to an enlargement of the heart. The one study reviewed shows that in adult rats, there are no sex differences under some treatment paradigms, but that when a sex difference arises, the effect is greater in females (Table 7.1.1.7).

Table 7.1.1.7. Perinatal alcohol exposure, effects on the heart.

Nature of Any Difference	Postpubertal
	Adult
Greater in males	
No signif. difference	**RODENT** *Rat*: Wilcoxon et al. 2003* (left ventricular hypertrophy after gestational exposure to mothers that were adrenalectomized)
Greater in females	**RODENT** *Rat*: Wilcoxon et al. 2003* (left ventricular hypertrophy after gestational exposure to non-adrenalectomized mothers)

7.1.1.8. Perinatal Alcohol Exposure, Effects on Hypoglycemia/Glucose Tolerance or Absorption

Perinatal exposure to alcohol in rats changes the physiological response to glucose in both sexes, but there are also some differences. While intact males show increased hypoglycemia as newborns, brain slices taken from the juvenile female brain show greater glucose absorption (Table 7.1.1.8).

Table 7.1.1.8. Perinatal alcohol exposure, effects on hypoglycemia/glucose tolerance or absorption.

Nature of Any Difference	Prepubertal	Postpubertal
	Infant	Adolescent
Greater in males	**RODENT** *Rat*: FE Lancaster & Speigel 1992* (hypoglycemia in newborns)	
No signif. difference		**RODENT** *Rat*: FE Lancaster & Speigel 1992* (P20, response to a glucose tolerance test)
Greater in females		**RODENT** *Rat*: Oyama & Oller Do Nascimento 2003 (in vitro glucose absorption by brain slices)

7.1.1.9. Perinatal Alcohol Exposure, Effects on the Hypothalamus

In the weeks following birth, there is an increase in the production of corticotrophin releasing factor (CRF) which is necessary for the release of adrenocorticotropin hormone from the hypothalamus. The one study reviewed shows that in rats, perinatal exposure to alcohol delays and exaggerates the production of CRF mRNA, which is necessary for subsequent CRF production, in females more than in males (Table 7.1.1.9).

Table 7.1.1.9. Perinatal alcohol exposure, effects on the hypothalamus.

Nature of Any Difference	Prepubertal
	Infant
Greater in males	
No signif. difference	
Greater in females	**RODENT** *Rat*: Aird et al. 1997 (embryonic exposure, delayed & exaggerated the typical developmental rise in mRNA levels of corticotropin releasing factor)

7.1.1.10. Perinatal Alcohol Exposure, Effects on the Liver

Perinatal exposure to alcohol leads to changes in the liver of neonatal rats, but depending on the paradigm used and the features of the liver measured, these effects appear to be either present in both sexes or are more pronounced in males (Table 7.1.1.10).

Table 7.1.1.10. Perinatal alcohol exposure, effects on the liver.

Nature of Any Difference	Prepubertal
	Infant
Greater decrease in males	**RODENT** *Rat*: Oyama & Oller Do Nascimento 2003 (in liver adenosine tri-phosphate-citrate lyase activity)
No signif. difference	**RODENT** *Rat*: FE Lancaster & Speigel 1992 (liver weight at P20)
Greater decrease in females	

7.1.1.11. Perinatal Alcohol Exposure, Effects on Motor Ability

The one study located shows that in rats, perinatal exposure to alcohol impaired adult motor performance in both sexes and that they were equally able to improve their performance with training (Table 7.1.1.11).

Table 7.1.1.11. Perinatal alcohol exposure, effects on motor ability.

Nature of Any Difference	Postpubertal
	Adult
Greater in males	
No signif. difference	**RODENT** *Rat*: Klintsova et al. 1998 (neonatal exposure, impairment in a motor task & improvement with rehabilitation treatment)
Greater in females	

7.1.1.12. Perinatal Alcohol Exposure, Effects on the Pancreas

Perinatal exposure to alcohol leads to an enlarged pancreas. The one study that was located on sex differences in this regard concluded that the enlargement was statistically equivalent (Table 7.1.1.12).

Table 7.1.1.12. Perinatal alcohol exposure, effects on the pancreas.

Nature of Any Difference	Prepubertal
	Infant
Greater in males	
No signif. difference	**RODENT** *Rat*: FE Lancaster & Speigel 1992 (enlargement at P20)
Greater in females	

7.1.1.13. Perinatal Alcohol Exposure, Effects on Paraventricular Nucleus

The one study located showed that perinatal exposure to alcohol produces a bigger reduction in the size of the paraventricular nucleus in females more than in males (Table 7.1.1.13).

Table 7.1.1.13. Perinatal alcohol exposure, effects on paraventricular nucleus.

Nature of Any Difference						Postpubertal
						Adult
Greater in males						
No signif. difference						
Greater in females						**RODENT** *Rat*: RF McGivern et al. 1998 (E14 exposure, decrease in volume)

7.1.1.14. Perinatal Alcohol Exposure, Effects on Self-Grooming

The one study located showed that in adult rats, perinatal exposure to alcohol leads to increases in stress-induced grooming when subjects were introduced to a novel test chamber. However, there was no sex difference between alcohol-exposed and control animals in self-grooming after animals were forced to swim (Table 7.1.1.14).

Table 7.1.1.14. Perinatal alcohol exposure, effects on self-grooming.

Nature of Any Difference						Postpubertal
						Adult
Greater in males						
No signif. difference						**RODENT** *Rat*: JH Hannigan et al. 1987* (levels of grooming after forced swim stress)
Greater in females						**RODENT** *Rat*: JH Hannigan et al. 1987* (levels of grooming in novel test chamber)

7.1.1.15. Perinatal Alcohol Exposure, Effects on Sexual Orientation

Based on retrospective accounts by mothers, one study of perinatal alcohol exposure found no evidence of altered sexual orientation in either male or female offspring. Thus, no significant sex differences in the effects of prenatal alcohol exposure could be documented (Table 7.1.1.15).

Table 7.1.1.15. Perinatal alcohol exposure, effects on sexual orientation.

Nature of Any Difference						Postpubertal
						Adult
Greater in males						
No signif. difference						**NORTH AMERICA** *United States*: L Ellis & Cole-Harding 2001
Greater in females						

7.1.1.16. Perinatal Alcohol Exposure, Effects on Spatial/Navigation Learning

Alcohol administration, either shortly before or after birth, leads to impairments in learning in juvenile and adult rats of both sexes. Table 7.1.1.16 suggests that adolescent males exhibit a greater impairment from such exposure than do females, while the impairment is greater for females, or there is no significant sex difference, in adulthood.

Table 7.1.1.16. Perinatal alcohol exposure, effects on spatial/navigation learning.

Nature of Any Difference					Postpubertal	
					Adolescent	Adult
Greater in males					**RODENT** *Rat*: CR Goodlett & Peterson 1995 (Morris Water Maze after P7-9 ethanol exposure)	
No signif. difference						**RODENT** *Rat*: RF McGivern et al. 1984 (a Lashley III maze); SJ Kelly et al. 1988* (visible platform Morris water maze)
Greater in females						**RODENT** *Rat*: SJ Kelly et al. 1988* (hidden platform Morris water maze)

7.1.1.17. Perinatal Alcohol Exposure, Effects on Water Consumption

One study using rats indicated that perinatal exposure to alcohol leads to a greater increase in water consumption in adulthood by males than by females (Table 7.1.1.17).

Table 7.1.1.17. Perinatal alcohol exposure, effects on water consumption.

Nature of Any Difference						Postpubertal
						Adult
Greater in males						**RODENT** *Rat*: RF McGivern et al. 1998 (ethanol exposure E14-parturition)
No signif. difference						
Greater in females						

7.1.2. Perinatal Cannabinoid Exposure Effects

Some women consume marijuana during pregnancy. Researchers have sought to determine what effects such consumption might have on offspring, including effects that could vary according to the offspring's sex. Findings are reviewed in the following tables.

7.1.2.1. Perinatal Cannabinoid Exposure, Effects on Dopamine

Table 7.1.2.1 cites one study using rats which indicated that perinatal exposure to hashish resulted in a greater decrease in dopamine levels in males than in females.

Table 7.1.2.1. Perinatal cannabinoid exposure, effects on dopamine.

Nature of Any Difference	Prepubertal					
	Neonate					
Decrease more in males	**RODENT** *Rat*: Rodriguez de Fonesca et al. 1992 (in prosencephalic areas prior to P9, hashish crude extract)					
No signif. difference						
Decrease more in females						

7.1.2.2. Perinatal Cannabinoid Exposure, Effects on the DOPAC/DA Ratio

In adulthood, one study suggested that when rats were exposed to hashish *in utero* and again in adulthood, female rats exhibited a greater increase in their DOPAC/DA ratio than did male rats (Table 7.1.2.2).

Table 7.1.2.2. Perinatal cannabinoid exposure, effects on the DOPAC/DA ratio.

Nature of Any Difference						Postpubertal
						Adult
Increase more in males						
No signif. difference						
Increase more in females						**RODENT** *Rat*: Rodriguez de Fonseca et al. 1990* (in striatal and limbic forebrain, in utero hashish crude extract & reexposure in adulthood)

7.1.2.3. Perinatal Cannabinoid Exposure, Effects on D1 Binding Sites

Perinatal exposure to hashish in combination with adult exposure was found to decrease D1 binding sites more in adult female than male rats, according to one study (Table 7.1.2.3).

Table 7.1.2.3. Perinatal cannabinoid exposure, effects on D1 binding sites.

Nature of Any Difference						Postpubertal
						Adult
Decrease more in males						
No signif. difference						
Decrease more in females						**RODENT** *Rat*: Rodriguez de Fonseca et al. 1990* (in striatum, exposure to hashish crude extract in utero and reexposure in adulthood)

7.1.2.4. Perinatal Cannabinoid Exposure, Effects on Activity/Locomotion

The one study located in which the effects of perinatal exposure to delta 9-THC was manipulated in order to assess its effect on activity, concluded that there was no significant effect on infant rats, but that in adulthood exposed female rats exhibited a greater decrease in locomotion than did exposed male rats (Table 7.1.2.4).

Table 7.1.2.4. Perinatal cannabinoid exposure, effects on activity/locomotion.

Nature of Any Difference	Prepubertal	Postpubertal
	Infant	Adult
Greater decrease in males		
No signif. diff.	**RODENT** *Rat*: M Navarro et al. 1994* (perinatal and lactational exposure)	
Greater decrease in females		**RODENT** Rat: M Navarro et al. 1994* (perinatal and lactational exposure)

7.1.2.5. Perinatal Cannabinoid Exposure, Effects on Morphine Intake

Perinatal exposure to delta 9-THC was found in two studies to cause greater self-administration of morphine by adult female rats than adult male rats (Table 7.1.2.5).

Table 7.1.2.5. Perinatal cannabinoid exposure, effects on morphine intake.

Nature of Any Difference	Postpubertal
	Adult
More in males	
No signif. difference	
More in females	**RODENT** *Rat*: Ambrosio et al. 1999 (self-administration); B Gonzalez et al. 2003 (self-administration)

7.1.2.6. Perinatal Cannabinoid Exposure, Effects on Pain Tolerance

Exposure to delta 9-THC in rats at around the time of birth leads to greater sensitivity to pain in juvenile males as compared to juvenile females (Table 7.1.2.6).

Table 7.1.2.6. Perinatal cannabinoid exposure, effects on pain tolerance.

Nature of Any Difference	Postpubertal
	Adolescent
More in males	**RODENT** *Rat:* Vela et al. 1995 (delta 9-THC, tail-flick withdrawal test)
No signif. difference	
More in females	

7.1.2.7. Perinatal Cannabinoid Exposure, Effects on Tyrosine Hydroxylase

According to one study, when rats were exposed to marijuana perinatally (combined with re-exposure in adulthood), males exhibited a greater decrease in striatal tyrosine hydroxylase (TH) activity and whole brain TH mRNA than did females as adults (Table 7.1.2.7).

Table 7.1.2.7. Perinatal cannabinoid exposure, effects on striatum.

Nature of Any Difference		Postpubertal
	Neonate	
Decrease more in males	**RODENT** *Rat*: Rodriguez de Fonesca et al. 1992 (activity in prosencephalic areas prior to P9, hashish crude extract); Bonnin et al. 1996 (in whole brain tyrosine hydroxylase mRNA G18-G21)	**RODENT** *Rat*: Rodriguez de Fonseca et al. 1990 (striatal tyrosine hydroxylase activity, hashish crude extract in utero and subsequent exposure in adulthood)
No signif. difference		
Decrease more in females		

7.1.3. Perinatal Cocaine Exposure Effects

Cocaine is a powerful stimulant drug that has been used by humans for centuries for both medical and recreational purposes. Beginning in the 1920s, many countries began to pass laws making at least the recreational use of cocaine illegal. Studies of sex differences in responses to cocaine are reviewed in the following subsection.

7.1.3.1. Perinatal Cocaine Exposure, Effects on Apomorphine Sensitivity

In the one pertinent study, it was reported that exposure to cocaine early in development lowered an adult male's sensitivity to apomorphine more than that of an adult female, among rats (Table 7.1.3.1).

Table 7.1.3.1. Perinatal cocaine exposure, effects on apomorphine sensitivity.

Nature of Any Difference					Postpubertal
					Adult
Greater in males					**RODENT** *Rat*: Y Busidan & Dow-Edwards (neonatal exposure to cocaine)
No signif. difference					
Greater in females					

7.1.3.2. Perinatal Cocaine Exposure, Effects on Grooming

For adult rats that had been exposed to cocaine *in utero*, one study suggested that females spent more time grooming an unfamiliar same-sex conspecific than did males (Table 7.1.3.2).

Table 7.1.3.2. Perinatal cocaine exposure, effects on grooming.

Nature of Any Difference					Postpubertal
					Adult
Greater in males					
No signif. difference					
Greater in females					**RODENT** *Rat*: JM Johns & Noonan 1995

7.1.3.3. Perinatal Cocaine Exposure, Effects on Locomotion/Activity

In three studies, findings suggest that prenatal cocaine exposure has a greater effect on females than on males regarding the amount of activity these animals display in adulthood (Table 7.1.3.3).

Table 7.1.3.3. Perinatal cocaine exposure, effects on locomotion/activity.

Nature of Any Difference				Postpubertal	
				Adolescent	Adult
Greater in males					
No signif. difference					
Greater in females				**RODENT** *Rat*: S Barron et al. 1996 (neonatal exposure P38-40, running wheel activity & activity with introduction of experimenter in the testing room)	**RODENT** *Rat:* Markowski et al. 1998 (running wheel activity); DB Miller & Seidler 1994

7.1.3.4. Perinatal Cocaine Exposure, Effects on Radial Arm Maze Performance

When tested on the radial arm maze, one study indicated that adult female rats that had been exposed to cocaine *in utero* were more impaired in their performance than were adult male rats (Table 7.1.3.4).

Table 7.1.3.4. Perinatal cocaine exposure, effects on radial arm maze performance.

Nature of Any Difference					Postpubertal
					Adult
Impairment was greater in males					
No signif. difference					
Impairment was greater in females					**RODENT** *Rat*: Levin & Seidler 1993

7.1.3.5. Perinatal Cocaine Exposure, Effects on Self-Administration

When exposed to cocaine *in utero*, one study found that as adults male rats were more likely to attempt to gain cocaine access on a lever pressing task than were females (Table 7.1.3.5).

Table 7.1.3.5. Perinatal cocaine exposure, effects on self-administration.

Nature of Any Difference						Postpubertal
						Adult
Greater in males						**RODENT** *Rat:* Markowski et al. 2000
No signif. difference						
Greater in females						

7.1.3.6. Perinatal Cocaine Exposure, Effects on Water Maze Performance

In the one study located, following perinatal exposure to cocaine, juvenile male rats exhibit more impairments in solving a spatial water maze task than did juvenile females (Table 7.1.3.6).

Table 7.1.3.6. Perinatal cocaine exposure, effects on water maze performance.

Nature of Any Difference					Postpubertal	
					Adolescent	
Impairment was greater in males					**RODENT** *Rat*: Choi et al. 1998 (spatial maze)	
No signif. difference						
Impairment was greater in females						

7.1.4. Perinatal Diazepam Exposure Effects

Diazepam is a muscle relaxant and sedative typically used for treatment of anxiety and tension. Below are findings from studies undertaken to determine its effects when administered perinatally (the equivalent to consumption by pregnant mothers).

7.1.4.1. Perinatal Diazepam Exposure, Effects on Exploratory Behavior

According to one study, perinatal exposure to diazepam led to a greater increase in exploratory behavior in males relative to females as adults (Table 7.1.4.1).

Table 7.1.4.1. Perinatal diazepam exposure, effects on exploratory behavior.

Nature of Any Difference						Postpubertal
						Adult
More in males						**RODENT** *Rat*: C Kellogg et al. 1991 (in the plus maze)
No signif. difference						
More in females						

7.1.4.2. Perinatal Diazepam Exposure, Effects on the Locus Coeruleus

One study revealed that perinatal administration of diazepam led to a greater increase in the size of the locus coeruleus in adult rats in males than in females (Table 7.1.4.2).

Table 7.1.4.2. Perinatal diazepam exposure, effects on the locus coeruleus.

Nature of Any Difference						Postpubertal
						Adult
More in males						**RODENT** *Rat*: Rodriguez-Zafra et al. 1993 (size of the locus coeruleus & number of neurons in the locus coeruleus)
No signif. difference						
More in females						

7.1.5. Perinatal Methamphetamine Exposure

Methamphetamine is a powerful stimulant drug that seems to primarily affect the function of dopaminergic neurons in the nervous system. When females take methamphetamine during pregnancy, the fetus is exposed perinatally.

7.1.5.1. Perinatal Methamphetamine Exposure, Effects on Dopamine

The one study reviewed showed that in adult rats, perinatal exposure to methamphetamine leads to greater decreases of dopamine levels in the brainstem of males compared to females (Table 7.1.5.1).

Table 7.1.5.1. Perinatal methamphetamine exposure, effects on dopamine.

Nature of Any Difference					Postpubertal	
						Adult
Greater in males						**RODENT** *Rat*: A Heller et al. 2001 (gestational days 7-18 exposure, reduction in levels in the striatum and ventral brainstem)
No signif. difference						
Greater in females						

7.1.5.2. Perinatal Methamphetamine, Effects on Locomotion

The one pertinent study that was located showed that the administration of methamphetamine in the week following birth lead to no significant sex differences in locomotion among adult rats (Table 7.1.5.2).

Table 7.1.5.2. Perinatal methamphetamine, effects on locomotion.

Nature of Any Difference					Postpubertal	
						Adult
Greater in males						
No signif. difference						**RODENT** *Rat*: Ferguson et al. 1996 (postnatal days 5-8 treatment)
Greater in females						

7.1.6. Perinatal Nicotine Exposure Effects

A number of studies have been done where rodents were exposed to nicotine during pregnancy in order to determine what effects, if any, such exposure has on the offspring.

7.1.6.1. Perinatal Nicotine Exposure, Effects on Avoidance Learning

One study using rats showed that avoidance learning was impaired more in male than female offspring from mothers exposed to nicotine during pregnancy (Table 7.1.6.1).

Table 7.1.6.1. Perinatal nicotine exposure, effects on avoidance learning.

Nature of Any Difference					Postpubertal	
						Adult
Impaired more in males						**RODENT** *Rat*: Genedani et al. 1983
No signif. difference						
Impaired more in females						

7.1.6.2. Perinatal Nicotine Exposure, Effects on Saccharin Preference

One study suggested that saccharin preference increased more in males than in females after their mothers had been exposed to nicotine during pregnancy (Table 7.1.6.2).

Table 7.1.6.2. Perinatal nicotine exposure, effects on saccharin preference.

Nature of Any Difference					Postpubertal	
						Adult
Greater increase in males						**RODENT** *Rat*: Lichtensteiger & Schlumpf 1985
No signif. difference						
Greater increase in females						

7.1.6.3. Perinatal Nicotine Exposure, Effects on Sexual Orientation

Among humans, one study indicated that mothers who smoked during pregnancy were more likely to have daughters who were lesbians as adults than were non-smoking mothers. Smoking among mothers had no significant relationship with sexual orientation of sons (Table 7.1.6.3).

Table 7.1.6.3. Perinatal nicotine exposure, effects on sexual orientation.

Nature of Any Difference					Postpubertal	
						Adult
Greater in males						
No signif. difference						
Greater in females						**NORTH AMERICA** *United States*: L Ellis & Cole-Harding 2001

7.1.7. Perinatal Stress Exposure Effects

Perinatal stress is not easily defined but has to do with the mother and/or her newborn being subjected to some sort of environmental trauma. In the following subsection, findings of sex differences in the effects of perinatal stress are reviewed.

7.1.7.1. Perinatal Stress Exposure, Effects on Activity

Research on the effects that perinatal stress, either alone or paired with subsequent stress in adulthood, generally indicates that female activity in adulthood is increased while in males activity may be decreased as a result of such stress (Table 7.1.7.1).

Table 7.1.7.1. Perinatal stress exposure, effects on activity.

Nature of Any Difference					Postpubertal	
						Adult
Greater in males						**RODENT** *Rat*: Perrot-Signal et al. 1999 (exposure to weasel odor, reduction in number of vertical movements & distance traveled in an open field)
No signif. difference						
Greater in females						**RODENT** *Rat*: Mendelson & McEwen 1991 (restraint stress, open field behavior); Kennett et al. 1986 (acute restraint stress, in an open field); CH West & Michael 1988 (5 days of pretest handling stress, locomotor activity)

7.1.7.2. Perinatal Stress Exposure, Effects on *c-fos*

A neuronal marker of cellular activity is called *c-fos*. One study of rats suggested that the induction of *c-fos*, with acute restraint stress, was greater in the cortex of male than female rats indicating a greater activation of the cortex with stress in males (Table 7.1.7.2).

Table 7.1.7.2. Perinatal stress exposure, effects on *c-fos*.

Nature of Any Difference					Postpubertal	
						Adult
Greater induction in males						**RODENT** *Rat*: Figueiredo et al. 2002 (acute restraint stress)
No signif. difference						
Greater induction in females						

7.1.7.3. Perinatal Stress Exposure, Effects on Corticoid mRNA Expression

In the one relevant study located, neither glucocorticoid nor mineralcorticoid receptors exhibited sex differences in offspring as a result of their mothers being stressed during pregnancy (Table 7.1.7.3).

Table 7.1.7.3. Perinatal stress exposure, effects on corticoid mRNA expression.

Nature of Any Difference					Postpubertal	
						Adult
Greater increase in males						
No signif. difference						**RODENT** *Rat*: Karandrea et al. 2002 (forced swimming stress, glucocorticoid and mineralcorticoid receptor mRNA in frontal cortex)
Greater increase in females						

7.1.7.4. Perinatal Stress Exposure, Effects on Corticosterone

Research findings pertaining to sex differences in corticosterone (CORT) levels resulting from perinatal stress has revealed seemingly mixed results. While perinatal stress does not affect fetal serum levels, it may affect adult CORT response to subsequent stress in males and females differently (Table 7.1.7.4).

Table 7.1.7.4. Perinatal stress exposure, effects on corticosterone.

Nature of Any Difference		Postpubertal
	Neonate	Adult
Greater in males		**RODENT** *Rat*: Reznikov & Nosenko 1995 (inhibition of increase in plasma levels in response to acute handling stress in males from dams subjected to restraint stress E15-21)
No signif. difference	**RODENT** *Mouse*: Montano et al. 1993 (fetal serum levels in fetuses from stressed dams)	
Greater in females		**RODENT** *Rat*: Jezova et al. 2002 (adults from dams food deprived during pregnancy, plasma levels in response to handling stress)

7.1.7.5. Stress Exposure, Effects on Corticosteroid-Binding Globulin

According to one study, corticosteroid-binding globulin levels are increased in adult females more than in adult male rats as a result of being subjected to prenatal stress (Table 7.1.7.5).

Table 7.1.7.5. Stress exposure, effects on corticosteroid-binding globulin.

Nature of Any Difference	Postpubertal
	Adult
Greater increase in males	
No signif. difference	
Greater increase in females	**RODENT** *Rat*: CM McCormick et al. 1995

7.1.7.6. Perinatal Stress Exposure, Effects on Dopamine

According to one study, males who are exposed to perinatal stress exhibit a greater decrease in dopamine levels in the frontal cortex than do females with exposure to a second stress in adulthood. This difference was not found, however, for measures of dopamine activity in the striatum in response to perinatal stress (Table 7.1.7.6).

Table 7.1.7.6. Perinatal stress exposure, effects on dopamine.

Nature of Any Difference	Postpubertal
	Adult
Greater decrease in males	**RODENT** *Rat*: Luine 2002 (chronic restraint stress, in frontal cortex)
No signif. difference	**RODENT** *Rat*: Kennett et al. 1986 (chronic restraint stress, dopamine metabolism in striatum); Kosten et al. 2003 (isolation stress, P10-levels of DOPAC in ventral striatum)
Greater decrease in females	

7.1.7.7. Perinatal Stress Exposure, Effects on 5-HIAA

One study suggested that 5-HIAA (a metabolite of serotonin) is elevated more in male than female rats who experienced stress perinatally and again in adulthood (Table 7.1.7.7).

Table 7.1.7.7. Perinatal stress exposure, effects on 5-HIAA.

Nature of Any Difference	Postpubertal
	Adult
Greater increase in males	**RODENT** *Rat*: GA Kennett et al. 1986 (chronic restraint stress-higher levels of 5-HIAA in frontal cortex)
No signif. difference	
Greater increase in females	

7.1.7.8. Perinatal Stress Exposure, Effects on Maze Performance

The single available study on maze performance following perinatal stress concluded that it affected the performance of male and female rats equally (Table 7.1.7.8).

Table 7.1.7.8. Perinatal stress exposure, effects on maze performance.

Nature of Any Difference					Postpubertal	
					Adolescent	
Greater in males						
No signif. difference					**RODENT** *Rat*: Gué et al. 2004 (Y-maze)	
Greater in females						

7.1.7.9. Perinatal Stress Exposure, Effects on Nerve Growth Factor

One study of infant rats concluded that the level of nerve growth factor in the prefrontal cortex was increased to the same degree in males and females following exposure to perinatal stress (Table 7.1.7.9).

Table 7.1.7.9. Perinatal stress exposure, effects on nerve growth factor.

Nature of Any Difference					
	Infant				
Greater increase in males					
No signif. difference	**RODENT** *Rat*: Scaccianoce et al. 2001 (P11 increase in nerve growth factor in prefrontal cortex, from dams with increased plasma corticosterone levels)				
Greater increase in females					

7.1.7.10. Perinatal Stress Exposure, Effects on Passive Avoidance

One study of rats that had been perinatally stressed suggested that the stress impaired passive avoidance more among females than among males during adolescence (Table 7.1.7.10).

Table 7.1.7.10. Perinatal stress exposure, effects on passive avoidance.

Nature of Any Difference					Postpubertal	
					Adolescent	
Greater in males						
No signif. difference						
Greater in females					**RODENT** *Rat*: Gué et al. 2004 (greater impairment)	

7.1.7.11. Perinatal Stress Exposure, Effects on Sexual Orientation

Two retrospective studies of humans have indicated that mothers who experience a great deal of emotional stress during pregnancy are more likely than relatively unstressed mothers to have male offspring who are homosexual. Such effects were largely absent among female offspring (Table 7.1.7.11).

Table 7.1.7.11. Perinatal stress exposure, effects on sexual orientation.

Nature of Any Difference						Postpubertal
						Adult
Greater in males						**NORTH AMERICA** *United States*: L Ellis et al. 1988; L Ellis & Cole-Harding 2001
No signif. difference						
Greater in females						

7.1.7.12. Prenatal Stress Exposure, Effects on Sucrose Preference/Intake

The one available study indicated that prenatal stress had no greater or lesser effect on adult sucrose preference by males than by females (Table 7.1.7.12).

Table 7.1.7.12. Prenatal stress exposure, effects on sucrose preference/intake.

Nature of Any Difference					Postpubertal	
						Adult
Greater in males						
No signif. diff.						**RODENT** *Rat*: Jezova et al. 2002 (adults from dams food stressed during pregnancy)
Greater in females						

7.2
RESPONSES TO DRUGS IN GENERAL

A few studies have explored the ability of males and females to discriminate or choose between drug and non-drug substances. The results are reviewed below.

7.2.1.1. Drug Discrimination Ability

One study found that female rats learned to discriminate between morphine and saline (salt water) faster than did males. However, no sex difference was found in the ability to discriminate between two other drugs and saline (Table 7.2.1.1).

Table 7.2.1.1. Drug discrimination ability.

Nature of Any Difference					Postpubertal	
						Adult
Greater in males						
No signif. difference						**RODENT** *Rat*: RM Craft & Stratmann 1996 (cocaine vs. saline); RM Craft et al. 1998 (U69,593 vs. saline)
Greater in females						**RODENT** *Rat*: RM Craft et al. 1996 (morphine vs. saline)

7.3
RESPONSES TO ANESTHETICS AND ANALGESICS

Both anesthetics and analgesics are drugs administered to help alleviate pain. These drugs differ in the sense that anesthetics are used to treat acute pain of limited duration (such as during surgery), while analgesics are used to treat chronic forms of pain. As this section reveals, numerous studies have found evidence of gender differences in responses to anesthetic and analgesic medications.

7.3.1. Responses to Anesthetics in General

Anesthetics are drugs that induce a state of temporary sleep and unconsciousness in subjects, usually to prevent patients from feeling pain. Studies of sex differences in response to anesthetics in general are reviewed in the following subsection.

7.3.1.1. Anesthetic Exposure in General, Pain Relief From

A couple of studies with rats suggested that males were more likely to exhibit symptoms of pain relief than were females with the use of local anesthetics (Table 7.3.1.1).

Table 7.3.1.1. Anesthetic exposure in general, pain relief from.

Nature of Any Difference					Postpubertal	
						Adult
Greater in males						**RODENT** *Rat*: Betts et al. 1995 (local anesthetics); ME Robinson et al. 1998 (local anesthetics)
No signif. difference						
Greater in females						

7.3.1.2. Anesthetics in General, Recovery From

According to one study in humans, females regained consciousness sooner after receiving various general anesthetics than was the case for males (Table 7.3.1.2). Although females appear to emerge from anesthesia more rapidly than males, they also have more complications.

Table 7.3.1.2. Anesthetics in general, recovery from.

Nature of Any Difference					Postpubertal	
						Adult
Sooner in males						
No signif. diff.						
Sooner in females						**OCEANIA** *Australia*: Myles et al. 2001 (emerged more quickly but had more complications)

7.3.1.3. Anesthetic Exposure in General, Effects on Vomiting and Nausea

One study concluded that females vomit more and exhibit greater symptoms of nausea following exposure to anesthetics relative to males given the same anesthetic (Table 7.3.1.3).

Table 7.3.1.3. Anesthetic exposure in general, effects on vomiting and nausea.

Nature of Any Difference					Postpubertal	
						Adult
More in males						
No signif. diff.						
More in females						**EUROPE** *Britain*: Myles et al. 2001

7.3.2. Responses to Alfentanil

Alfentanil is a potent synthetic opioid used for pain relief during surgery or following trauma. It tends to act quickly but its analgesic effects disappear within a few hours.

7.3.2.1. Alfentanil Exposure, Rate of Clearance

The clearance rate for alfentanil appears to either be faster for females or there is no significant sex difference, perhaps depending in part on age (Table 7.3.2.1).

Table 7.3.2.1. Alfentanil exposure, rate of clearance.

Nature of Any Difference					Postpubertal	
						Adult
Faster in males						
No signif. diff.						**EUROPE** *Netherlands*: Lemmens et al. 1990* (plasma clearance for patients over 50 years of age) **NORTH AMERICA** *Canada*: Sitar et al. 1989 (clearance rate); *United States*: Lemmens et al. 1990* (clearance rate)
Faster in females						**EUROPE** *Netherlands*: Lemmens et al. 1990* (plasma clearance for patients under 50 years of age) **NORTH AMERICA** *United States*: Lemmens et al. 1990* (young, clearance rate)

7.3.2.2. Alfentanil Exposure, Therapeutic (Antinociceptive) Effect

The ability of alfentanil to diminish pain sensations was found to be greater for male rats than for female rats according to the one relevant study that was located (Table 7.3.2.2).

Table 7.3.2.2. Alfentanil exposure, therapeutic (antinociceptive) effect.

Nature of Any Difference					Postpubertal	
						Adult
More in males						**RODENT** *Rat:* Cicero et al. 1997 (hot plate test)
No signif. difference						
More in females						

7.3.2.3. Alfentanil Exposure, Speed of Recovery From

According to one study, females regained consciousness sooner after receiving alfentanil than was true for males (Table 7.3.2.3).

Table 7.3.2.3. Alfentanil exposure, speed of recovery from.

Nature of Any Difference					Postpubertal	
						Adult
Sooner in males						
No signif. diff.						
Sooner in females						**NORTH AMERICA** *United States*: Gan et al. 1999

7.3.3. Responses to Atracurium

Atracurium is a pain killing drug used fairly often in China during surgery. The limited research on sex differences in responses to this drug is presented below.

7.3.3.1. Atracurium Exposure, Effects on Neuromuscular Blocking

According to one study, exposure to the anesthetic atracurium was more effective in inducing neuromuscular blockage, and thus preventing movement, in females than in males (Table 7.3.3.1).

Table 7.3.3.1. Atracurium exposure, effects on neuromuscular blocking.

Nature of Any Difference					Postpubertal	
						Adult
Greater in males						
No signif. diff.						
Greater in females						**ASIA** *China*: Xue et al. 1999

7.3.4. Responses to Flumazenil

Flumazenil is a benzodiazepine receptor blocker and is sometimes used to induce sedation and diminish pain sensitivity. Flumazenil is also sometimes administered to patients who may have overdosed with other benzodiazepines.

7.3.4.1. Flumazenil Exposure, Therapeutic (Antinociceptive) Effects

The one available study shows that in adult rats, administration of flumazenil appears to affect males and females equally in terms of pain sensitivity. However, two studies concluded that when coupled with morphine, flumazenil attenuated sensitivity to pain more in females than in males (Table 7.3.4.1).

Table 7.3.4.1. Flumazenil exposure, therapeutic (antinocieptic) effects.

Nature of Any Difference					Postpubertal	
						Adult
Greater in males						
No signif. difference						**RODENT** *Rat*: JR Holtman et al. 2003a:149* (thermal tail flick test)
Greater in females						**RODENT** *Rat*: JR Holtman et al. 2003a:149* (thermal tail flick test, administered with morphine); JR Holtman et al. 2003b (administered with morphine)

7.3.4.2. Flumazenil Exposure, Effects on Locomotion

According to one study of rats, females exhibited greater increases in locomotion following flumazenil administration than do males (Table 7.3.4.2).

Table 7.3.4.2. Flumazenil exposure, effects on locomotion.

Nature of Any Difference					Postpubertal	
						Adult
Greater in males						
No signif. diff.						
Greater in females						**RODENT** *Rat*: JR Holtman et al. 2003b

7.3.5. Responses to Ibuprofen

Ibuprofen is a widely-used pain medication. Studies of sex differences in the effects of this drug are presented below.

7.3.5.1. Ibuprofen Exposure, Therapeutic (Antinociceptive) Effect

One study of ibuprofen concluded that it was more effective in relieving pain for male subjects than for female subjects. A second study failed to detect a significant sex difference (Table 7.3.5.1).

Table 7.3.5.1. Ibuprofen exposure, therapeutic (antinociceptive) effect.

Nature of Any Difference					Postpubertal	
						Adult
Greater in males						**NORTH AMERICA** *United States*: JS Walker & Carmody 1998 (experimentally-induced pain)
No signif. diff.						**NORTH AMERICA** *United States*: Averbuch & Katzper 2000
Greater in females						

7.3.6. Responses to Opioid Anesthetics in General

Opiate drugs are derived from the poppy plant and have been used for centuries for the relief of pain, although these drugs are also sometimes consumed on a recreational basis.

7.3.6.1. Opiates Exposure in General, Therapeutic (Antinociceptive) Effect

Research pertaining to the analgesic (pain relieving) effects of opiates in general (excluding kappa receptor opioids) has revealed that males are able to derive greater effects than females, both in humans and in rodents (Table 7.3.6.1). Readers may note that some of the studies cited in this table are also cited in tables on responses to specific opiates.

Table 7.3.6.1. Opiates exposure in general, therapeutic (antinociceptive) effect.

Nature of Any Difference					Postpubertal		Multiple Age Categories
						Adult	
Greater in males						**NORTH AMERICA** *United States*: Cicero et al. 1996 (opioids); Sarton et al. 2000 (dose adjusted for body weight) **RODENT** *Mouse*: Kaveliers & Innes 1987 (opioids); Candido et al. 1992; *Rat*: Kepler et al. 1989; Tsang et al. 1992; Islam et al. 1993; Cicero et al. 1996 (faster dose-response curve); Bartok & Craft 1997; Cicero et al. 1997; J Boyer et al. 1998; Krzanowska & Bodnar 1999; Krzanowska & Bodnar 2000	**RODENT** *Mouse*: Kavaliers & Innes 1987; Kavaliers & Innes 1990; Lipa & Kavaliers 1990; Kepler et al. 1991 (pain tolerance with opium)
No signif. diff.							
Greater in females						**RODENT** *Rat*: RJ Holtman et al. 2003b (when administered with flumazenil); RW Gear et al. 1996a (pentazocine, a kappa opioid); RW Gear et al. 1996b (kappa opioids); RW Gear et al. 1999 (kappa opioids)	

7.3.6.2. Opiates Exposure in General, Therapeutic Response Curve

According to one study, male rats exhibited a more rapid response to opiates than did female rats (Table 7.3.6.2).

Table 7.3.6.2. Opiates exposure in general, therapeutic response curve.

Nature of Any Difference					Postpubertal	
						Adult
Faster in males						**RODENT** *Rat*: Cicero et al. 1996
No signif. diff.						
Faster in females						

7.3.6.3. Beta-Endorphin Exposure, Effects on Locomotion

The periaqueductal gray (PAG) is an area of the CNS that is involved in the perception of pain. Beta-endorphin, an opioid peptide, injected into the PAG of rats resulted initially in an equal amount of decreased locomotor behavior in both sexes. However, later on, males began to exhibit more locomotion than did females after receiving this drug (Table 7.3.6.3).

Table 7.3.6.3. Beta-endorphin exposure, effects on locomotion.

Nature of Any Difference						Postpubertal
						Adult
More in males						**RODENT** *Rat*: Kranowska & Bodnar 2000* (micro-injection into the ventrolateral periaqueductal gray, locomotor activity 90-120 min.)
No signif. difference						**RODENT** *Rat*: Kranowska & Bodnar 2000 (micro-injection into the ventrolateral periaqueductal gray)
More in females						

7.3.7. Responses to Beta-Endorphin

Beta-endorphin is naturally produced in the hypothalamus but can be produced synthetically as well. Sex differences in reponse to beta-endorphin exposure are reviewed below.

7.3.7.1. Beta-Endorphin Exposure, Therapeutic (Antinociceptive) Effects

In the one pertinent study located, male rats exhibited greater tolerance to a painful stimulus following the injection of beta-endorphin into the periaqueductal gray area than did female rats (Table 7.3.7.1).

Table 7.3.7.1. Beta-endorphin exposure, therapeutic (antinociceptive) effects.

Nature of Any Difference						Postpubertal
						Adult
More in males						**RODENT** *Rat*: Kranowska & Bodnar 2000 (micro-injection into the ventrolateral periaqueductal gray, tail flick latencies in response to a painful stimuli)
No signif. difference						
More in females						

7.3.8. Responses to Bremazocine

Bremazocine is a kappa receptor opioid agonist, and has been used in pain relief. Findings from studies of sex differences in the effects of this drug are presented below.

7.3.8.1. Bremazocine Exposure, Effects on Locomotion

In the one study located, no differences between male and female rats was found in the suppression of locomotion with bremazocine (Table 7.3.8.1).

Table 7.3.8.1. Bremazocine exposure, effects on locomotion.

Nature of Any Difference						Postpubertal
						Adult
More in males						
No signif. difference						**RODENT** *Rat*: RM Craft & Bernal 2001 (suppression of locomotor activity)
More in females						

7.3.8.2. Bremazocine Exposure, Effects on Diuresis

The one relevant study revealed no difference between male and female rats has found with regard to the inducement of urination by bremazocine (Table 7.3.8.2).

Table 7.3.8.2. Bremazocine exposure, effects on diuresis.

Nature of Any Difference					Postpubertal	
						Adult
More in males						
No signif. difference						**RODENT** *Rat*: RM Craft et al. 2000 (inducement of diuresis when matched for body weight)
More in females						

7.3.9. Responses to Buprenorphine

Buprenorphine is a mu receptor opioid agonist that decreases pain sensitivity. Studies of sex differences in response to this drug are revealed in the following subsection.

7.3.9.1. Buprenorphine Exposure, Therapeutic (Antinociceptive) Effect

Most studies have found that buprenorphine is more effective at decreasing the apparent sensation of pain in male rats than in female rats (Table 7.3.9.1).

Table 7.3.9.1. Buprenorphine exposure, therapeutic (antinociceptive) effect.

Nature of Any Difference					Postpubertal	
						Adult
More in males						**RODENT** *Rat*: JM Terner et al. 2003 (warm water tail withdrawal test); JM Terner et al. 2002 (warm water tail withdrawal test); AC Barrett et al. 2002 (during a mechanical nociceptive stimulus application); CD Cook et al. 2000 (a warm water tail withdrawal test with various stimulus intensities); AC Barrett et al. 2001 (warm water tail withdrawal test); RW Gear et al. 1996a (the opioid butorphan)
No signif. difference						**RODENT** *Rat*: RE Bartok & Craft 1997 (using a hot plate & tail withdrawal test)
More in females						

7.3.10. Responses to Butorphanol

Butorphanol is an opioid painkiller that acts as a mu opioid receptor agonist that is frequently used as a pre-surgical painkiller. Sex differences in responses to this drug are reviewed below.

7.3.10.1. Butorphanol, Effects on Locomotion

One study indicated that there are no sex differences among rats in the suppression of locomotor behavior with butorphanol (Table 7.3.10.1).

Table 7.3.10.1. Butorphanol, effects on locomotion.

Nature of Any Difference					Postpubertal	
						Adult
More in males						
No signif. difference						**RODENT** *Rat*: RM Craft & Bernal 2001
More in females						

7.3.10.2. Butorphanol Exposure, Therapeutic (Antinociceptive) Effect

In all studies located, butorphanol decreased the sensitivity to painful stimuli in male rats to a greater extent than in female rats. One study of humans found this same sex difference (Table 7.3.10.2).

Table 7.3.10.2. Butorphanol exposure, therapeutic (antinociception) effect.

Nature of Any Difference					Postpubertal
					Adult
More in males					**NORTH AMERICA** *United States*: RW Gear et al. 1996a **RODENT** *Rat*: JM Terner et al. 2003 (warm water tail withdrawal test); JM Terner et al. 2002 (warm water tail withdrawal test); AC Barrett et al. 2002 (mechanical nociceptive stimulus application); CD Cook et al. 2000 (warm water tail withdrawal test with various stimulus intensities); CD Cook & Nickerson 2004 (among arthritic rats); RM Craft & Bernal 2001 (tail withdrawal and hot plate test)
No signif. difference					
More in females					

7.3.10.3. Butorphanol Exposure, Effects on Diuresis

According to two studies, consumption of butorphanol induced urination (diuresis) to a greater degree in female rats than in male rats (Table 7.3.10.3).

Table 7.3.10.3. Butorphanol exposure, effects on diuresis.

Nature of Any Difference					Postpubertal
					Adult
More in males					
No signif. difference					
More in females					**RODENT** *Rat*: RM Craft et al. 2000 (matched for body weight); RM Craft & McNeil 2003

7.3.11. Responses to Deltorphin

Deltorphin is a delta opioid receptor agonist that is still largely experimental in terms of any medical applications.

7.3.11.1. Deltorphin Exposure, Therapeutic (Antinociceptive) Effects

In the one study, deltorphin was found to have greater antinociceptive effects in male rats than in their female counterparts for the hot plate test, although no significant sex difference was found in the tail withdrawal task (Table 7.3.11.1).

Table 7.3.11.1. Deltorphin exposure, therapeutic (antinociceptive) effects.

Nature of Any Difference					Postpubertal
					Adult
More in males					**RODENT** *Rat*: RE Bartok & Craft 1997* (highest doses, greater hot plate antinociception)
No signif. difference					**RODENT** *Rat*: RE Bartok & Craft 1997* (low doses, tail withdrawal task)
More in females					

7.3.12. Responses to Dezocine

Dezocine is a mu opioid agonist that acts primarily in the peripheral nervous system since it does not cross the blood-brain barrier. It is often used for treating severe diarrhea in humans. Studies of sex differences in responses to dezocine appear below.

7.3.12.1. Dezocine Exposure, Therapeutic (Antinociceptive) Effects

In general, like other mu opioid agonists, decozine has a greater effect on nociception in male rats than in female rats (Table 7.3.12.1). Interestingly, this sex difference seems to be exacerbated by pretreatment with morphine, also a mu opioid receptor agonist.

Table 7.3.12.1. Dezocine exposure, therapeutic (antinociceptive) effects.

Nature of Any Difference						Postpubertal
						Adult
More in males						**RODENT** *Rat*: JM Terner et al. 2002 (warm water tail withdrawal test); AC Barrett et al. 2002 (during a mechanical nociceptive stimulus application); CD Cook et al. 2000 (warm water tail withdrawal test with various stimulus intensities); AC Barrett et al. 2001* (warm water tail withdrawal test without & especially with chronic morphine pretreatment)
No signif. difference						
More in females						

7.3.13. Responses to Enadoline

Enadoline is a kappa opioid receptor agonist often used as an anesthetic. Evidence concerning possible sex differences in responses to this drug is reviewed below.

7.3.13.1. Enadoline Exposure, Therapeutic (Antinociceptive) Effects

The one relevant study located found no sex differences in the antinociceptive effects of enadoline when administered to rats (Table 7.3.13.1).

Table 7.3.13.1. Enadoline exposure, therapeutic (antinociceptive) effects.

Nature of Any Difference						Postpubertal
						Adult
More in males						
No signif. difference						**RODENT** *Rat*: AC Barrett et al. 2002 (mechanical nociceptive stimulus application)
More in females						

7.3.14. Responses to Ethylketazocine

Ethylketazocine is a kappa receptor opioid agonist resembling morphine. Research on any sex differences in the effects of ethylketazocine is summarized in the following tables.

7.3.14.1. Ethylketazocine Exposure, Therapeutic (Antinociceptive) Effects

According to Table 7.3.14.1, ethylketazocine seemed to be more effective in inducing antinociception in male than in female rats when tested with a tail withdrawal task, but there was no sex difference when tested with other pain tasks.

Table 7.3.14.1. Ethylketazocine exposure, therapeutic (antinociceptive) effects.

Nature of Any Difference						
						Adult
More in males						**RODENT** *Rat*: RM Craft & Bernal 2001* (tail withdrawal test)
No signif. difference						**RODENT** *Rat*: RM Craft & Bernal 2001* (hot plate test); AC Barrett et al. 2002 (mechanical nociceptive stimulus application)
More in females						

7.3.14.2. Ethylketazocine Exposure, Effects on Locomotion

In the one study located, ethylketazocine was found to be equally effective in male and female rats in reducing locomotor activity (Table 7.3.14.2).

Table 7.3.14.2. Ethylketazocine exposure, effects on locomotion.

Nature of Any Difference						Postpubertal
						Adult
More suppression in males						
No signif. difference						**RODENT** *Rat*: RM Craft & Bernal 2001 (suppression of locomotor activity)
More suppression in females						

7.3.15. Responses to Enkephalin

Enkephalins are mu receptor opioid agonists that may be helpful in the treatment of anxiety and depression as well as the alleviation of pain. Findings from the small number of studies of sex differences in responses to such drugs are presented below.

7.3.15.1. Enkephalin Exposure, Therapeutic (Antinociceptive) Effects

Studies of the effects of enkephalin, a mu receptor opioid agonist, on the suppression of nociception in rodents have presented mixed results regarding sex differences. Its varied effects are likely due to the test and species used (Table 7.3.15.1).

Table 7.3.15.1. Enkephalin exposure, therapeutic (antinociceptive) effects.

Nature of Any Difference					Postpubertal	
						Adult
More in males						**RODENT** *Rat*: KL Kepler et al. 1991* (in peak and total analgesia using a tail flick test); *Mouse*: Kest et al. 1995* (tail flick antinociception in mice bred for a high analgesic response in a forced swim test)
No signif. difference						**RODENT** *Rat*: KL Kepler et al. 1991* (in analgesia using a jump test); *Mouse*: Kest et al. 1995* (tail flick antinociception in Swiss Webster mice and mice bred for a low analgesic response in a force swim test)
More in females						

7.3.16. Responses to Etorphine

Etorphine, a synthetic cousin to morphine, appears to be the most powerful drug for alleviating pain yet identified, and is pharmacologically active at all three known opioid receptors (i.e., mu, kappa, and delta). Sex difference research surrounding responses to this drug appears below.

7.3.16.1. Etorphine Exposure, Therapeutic (Antinociceptive) Effects

Etorphine is most often used to immobilize elephants and other large mammals. In the two studies reviewed, it was more affective at inducing antinociception in male rats than in female rats (Table 7.3.16.1).

Table 7.3.16.1. Etorphine exposure, therapeutic (antinociceptive) effects.

Nature of Any Difference					Postpubertal	
						Adult
More in males						**RODENT** *Rat*: JM Terner et al. 2002 (warm water tail withdrawal test); CD Cook et al. 2000 (warm water tail withdrawal test)
No signif. difference						
More in females						

7.3.17. Responses to Ibogaine

Ibogaine is an indole alkaloid, a long-acting hallucinogen that has been used in the treatment of opioid addiction. Sex difference research on the effects of this drug is reviewed below.

7.3.17.1. Ibogaine Exposure, Brain and Plasma Levels

According to one study, when rats receive ibogaine, females had higher levels of this drug in both plasma and brain tissue than did males (Table 7.3.17.1).

Table 7.3.17.1. Ibogaine exposure, brain and plasma levels.

Nature of Any Difference					Postpubertal	
						Adult
More in males						
No signif. difference						
More in females						**RODENT** *Rat:* SM Pearl et al. 1997

7.3.17.2. Ibogaine Exposure, Effects on Morphine Induced Locomotion

Morphine tends to induce locomotive behavior in rats. In one study, the administration of ibogaine (as well as the closely related drug, noribogaine) counteracted this morphine effect more in females than in males (Table 7.3.17.2).

Table 7.3.17.2. Ibogaine exposure, effects on morphine induced locomotion.

Nature of Any Difference					Postpubertal	
						Adult
Morphine effects inhibited more in males						
No signif. difference						
Morphine effects inhibited more in females						**RODENT** *Rat:* SM Pearl et al. 1997 (ibogaine & noribogaine)

7.3.18. Responses to Kappa Receptor Opioids in General

Kappa receptor opioids are those that act specifically on the kappa opioid receptors. Findings from studies of how males and females may respond differently to this class of drugs appear in the following table.

7.3.18.1. Kappa Receptor Opioid Exposure in General, Therapeutic (Antinociceptive) Effects

Studies of kappa receptor opioids in rats have consistently shown these drugs to be more effective at relieving pain for females than for males (Table 7.3.18.1).

Table 7.3.18.1. Opiates exposure in general, therapeutic (antinociceptive) effect.

Nature of Any Difference					Postpubertal	
						Adult
Greater in males						
No signif. diff.						
Greater in females						**RODENT** *Rat*: RJ Holtman et al. 2003b (when administered with flumazenil); RW Gear et al. 1996a (pentazocine, a kappa opioid); RW Gear et al. 1996b (kappa opioids); RW Gear et al. 1999 (kappa opioids)

7.3.19. Responses to l-Pyrrolidinyl

The agonist 1-pyrrolidinyl is a high affinity sigma receptor ligand used to inhibit pain sensations. Research on sex differences in responses to this drug is reviewed below.

7.3.19.1. l-Pyrrolidinyl Exposure, Therapeutic (Antinociceptive) Effects

Table 7.3.19.1 shows that one study in which l-pyrolidinyl was administered to rats found the drug to be equally effective in inducing antinociception for males and females.

Table 7.3.19.1. 1-Pyrrolidinyl exposure, therapeutic (antinociceptive) effects.

Nature of Any Difference					Postpubertal	
						Adult
More in males						
No signif. difference						**RODENT** *Rat:* AC Barrett et al. 2002 (mechanical nociceptive stimulus application)
More in females						

7.3.20. Responses to Levorphanol

Levorphanol is a mu receptor opioid agonist that is used to relieve moderate to severe pain in humans. Studies of sex differences in response to this drug are summarized below.

7.3.20.1. Levorphanol Exposure, Therapeutic (Antinociceptive) Effects

According to a couple of studies of rats, males exhibited greater antinociceptive effects from receiving levorphanol than did females (Table 7.3.20.1).

Table 7.3.20.1. Levorphanol exposure, therapeutic (antinociceptive) effects.

Nature of Any Difference					Postpubertal
					Adult
More in males					**RODENT** *Rat*: AC Barrett et al. 2002 (during a mechanical nociceptive stimulus application); CD Cook et al. 2000 (warm water tail withdrawal test)
No signif. difference					
More in females					

7.3.21. Responses to Morphine

The most widely used therapeutic opiate is morphine. In recent years, morphine has been widely used to treat cancer patients in the terminal stages of their illness.

7.3.21.1. Morphine Exposure, Effects on Brain Levels

In some studies, administration of morphine in rats has been found to lead to higher levels of this drug in the brains of male rats. In other studies, however, no significant sex differences were found (Table 7.3.21.1).

Table 7.3.21.1. Morphine exposure, effects on brain levels.

Nature of Any Difference					Postpubertal
					Adult
Remains longer in males					**RODENT** *Mouse*: Candido et al. 1992 (systemic treatment); *Rat*: RM Craft et al. 1996 (after systemic injection)
No signif. difference					**RODENT** *Rat*: Cicero et al. 1997 (60 minutes post injection, peak levels, elimination half-life, or disappearance of morphine from the brain); Cicero et al. 2000 (varied doses); RM Craft et al. 1996 (20 min. post-injection)
Remains longer in females					

7.3.21.2. Morphine Exposure, Effects on Blood/Plasma Levels

Research indicates that administration of morphine to rats results in no sex differences in the amount of this drug found in blood serum. However, in one study the morphine metabolite, morphine-3-glucuronide, was higher in blood plasma of females than in males, which suggests that the metabolism of morphine may differ between the sexes (Table 7.3.21.2).

Table 7.3.21.2. Morphine exposure, effects on blood levels.

Nature of Any Difference					Postpubertal
					Adult
More in males					
No signif. difference					**RODENT** *Rat*: TJ Cicero et al. 1996 (serum morphine levels); TJ Cicero et al. 1997 (blood levels); TJ Cicero et al. 2000 (varied doses); RM Craft et al. 1996 (plasma levels 20 min. post-injection)
More in females					**RODENT** *Rat*: L Baker & Ratka 2002 (plasma levels of morphine-3-glucuronide)

7.3.21.3. Morphine Exposure, Effects on Body Temperature

In both mice and rats, studies have reported that morphine altered body temperature to a greater degree in females than males. Interestingly, the effects were in the opposite direction depending on the species used, with female rats becoming more hyperthermic than males with morphine exposure, and female mice becoming more hypothermic than males with exposure (Table 7.3.21.3).

Table 7.3.21.3. Morphine exposure, effects on body temperature.

Nature of Any Difference					Postpubertal
					Adult
More in males					
No signif. difference					
More in females					**RODENT** *Mouse*: Kest et al. 2000 (hypothermia resulting from acute or chronic doses); *Rat*: de-la-Cruz et al. 1987 (hyperthermia, morphine alone or with haloperidol)

7.3.21.4. Morphine Exposure, Effects on Corticosteroid-Binding Globulin

According to one study of rats, males had higher levels of corticosteroid-binding globulin in their blood than did females (relative to controls) after being administered equal quantities of morphine (Table 7.3.21.4).

Table 7.3.21.4. Morphine exposure, effects on corticosteroid-binding globulin.

Nature of Any Difference					Postpubertal	
						Adult
Greater in males						**RODENT** *Rat*: Nock et al. 1998 (blood levels after chronic morphine treatment)
No signif. diff.						
Greater in females						

7.3.21.5. Morphine Exposure, Effects on Defensive Behavior

In one study, it was found that the administration of morphine increased defensive behavior to a greater degree in female than in male rats (Table 7.3.21.5).

Table 7.3.21.5. Morphine exposure, effects on defensive behavior.

Nature of Any Difference					Postpubertal	
						Adult
More in males						
No signif. difference						
More in females						**RODENT** *Rat*: BA Blanchard et al. 1991

7.3.21.6. Morphine Exposure, Effects on Diuresis

Table 7.3.21.6 shows that one study found male rats urinating more often than female rats after being administering morphine.

Table 7.3.21.6. Morphine exposure, effects on diuresis.

Nature of Any Difference					Postpubertal	
						Adult
Greater in males						**RODENT** *Rat*: Craft et al. 2000 (matched for body weight)
No signif. difference						
Greater in females						

7.3.21.7. Morphine Exposure, Effects on Drug Induced Place Preference

One study suggested that with high doses of morphine, female rats more quickly developed a preference to spend time in the place where the drug was received did males. This sex difference was not found for lower doses of morphine (Table 7.3.21.7).

Table 7.3.21.7. Morphine exposure, effects on drug induced place preference.

Nature of Any Difference					Postpubertal	
						Adult
Greater in males						
No signif. difference						**RODENT** *Rat*: TJ Cicero et al. 2000* (0.2 to 10.0 mg/kg induced an equal preference for drug-associated chamber)
Greater in females						**RODENT** *Rat*: TJ Cicero et al. 2000* (17.5 to 30.0 mg/kg greater preference for drug-associated chamber)

7.3.21.8. Morphine Exposure, Effects on Feeding Behavior

Sex differences in the effects of morphine administration on food intake by rats appear to be variable (Table 7.3.21.8). This variability may be due to the route of injection, intracerebroventricular (icv) or systemic, and the dose injected.

Table 7.3.21.8. Morphine exposure, effects on feeding behavior.

Nature of Any Difference					Postpubertal
					Adult
More in males					**RODENT** *Rat*: Bodnar et al. 2003* (morphine induced feeding - low dose .0005 microg , icv)
No signif. difference					**RODENT** *Mouse*: Marrazzi et al. 1996*; *Rat*: Marrazzi et al. 1996*
More in females					**RODENT** *Rat*: Bodnar et al. 2003* (morphine induced feeding - high dose 5 microg , icv)

7.3.21.9. Morphine Exposure, Effects on Locomotion

Research concerning sex differences in locomotion following exposure to morphine has been somewhat inconsistent. Some studies suggest that males and females are affected equally while others indicate that at least in adults, females levels of locomotion are increased and/or decreased less than that of males (Table 7.3.21.9).

Table 7.3.21.9. Morphine exposure, effects on locomotion.

Nature of Any Difference	Prepubertal			Postpubertal	
	Neonate			Adolescent	Adult
More in males					
No signif. difference	**RODENT** *Rat*: PA Caza & Spear 1980			**RODENT** *Rat*: CK Randall et al. 1998*	**RODENT** *Rat*: RM Craft et al. 1996
More in females					**RODENT** *Rat*: CK Randall et al. 1998* (greater locomotion); JS Boyer et al. 1998 (less of a decrease in locomotion with increasing dose)

7.3.21.10. Morphine, Therapeutic (Antinociceptive) Effects

In general, studies have shown morphine to be more effective in alleviating pain in males than females. While the studies reviewed mostly involve experimental work with rodents, especially rats, those cases where data are available on humans suggest the same conclusion (Table 7.3.21.10).

Table 7.3.21.10. Morphine, therapeutic (antinociceptive) effects.

Nature of Any Difference						Postpubertal
						Adult
Greater in males						**EUROPE** *Netherlands*: Sarton et al. 2000 (pain tolerance) **LATIN AMERICA** *Columbia*: Cepeda et al. 2002 (following surgery) **RODENT** *Deer Mouse:* M Kavaliers & Innes 1987; Kavaliers & Innes 1987; SM Lipa & Kavaliers; *Mouse:* JE Grisel et al. 1996 (tail withdrawal task); JK Candido et al. 1992 (with 8 days pretreatment with naltrexone after adrenalectomy); *Rat*: Badillo-Martinez et al. 1984* (hot plate test); Bodnar et al. 1988; Baamonde et al. 1989; Kepler et al. 1991; Krzanowska et al. 2000 (injected into the ventrolateral periaqueductal gray, tail-flick and jump test); Islam et al. 1993 (tail-flick test); KL Kepler et al. 1989 (intracerebroventricular administration, tail flick and jump test); TJ Cicero et al. 1996 (hot-plate & tail flick test); Baamonde et al. 1989 (abdominal contractions induced by injections of hypertonic saline); RM Craft et al. 1996 (acute dose, hotplate test); JM Terner et al. 2003 (tail withdrawal warm water bath); JM Terner et al. 2003 (warm water tail withdrawal test); AC Barrett et al. 2002 (mechanical nociceptive stimulus application); CD Cook et al. 2000 (warm water tail withdrawal test); AC Barrett et al. 2001 (warm water tail withdrawal test); JR Holtman et al. 2003 (thermal tail flick test); JR Holtman et al. 2003; CD Cook & Nickerson 2004 (in arthritic rats); JR Holtman et al. 2004 (acute dose, tail flick test); L Baker & Ratka 2002; Krzanowska et al. 2002 (morphine perfused into the ventrolateral periaqueductal gray); Cicero et al. 1997 (hot plate test); JS Boyer et al. 1998 (injections into the ventromedial medulla); Krzanowska & Bodnar 1999 (microinjection into the ventrolateral periaqueductal gray, tail flick and jump test); RM Craft et al. 1999 (hot plate tail withdrawal task)
No signif. difference						**RODENT** *Mouse:* EG Hopkins et al. 2004 (on a tail flick test after 3 days of intrathecal injections); *Rat*: Badillo-Martinez et al. 1984* (equal jump test); SM South et al. 2001 (co-infused with chloramphenicol; hot plate test); RB Kanerek & Homoleski 2000 (tail-flick & hot plate test); D Jourdan et al. 2000 (paw pressure test); RB Kanarek et al. 2001 (injected into the periaquaductal gray, tail flick test); RM Craft et al. 1999 (weekly treatment, hot plate tail withdrawal task)
Greater in females						**RODENT** *Rat*: A Baamonde et al. 1989 (on abdominal contractions induced by injections of hypertonic saline after swim stress); Kalinichev et al. 2001 (when combined with maternal separation P2-14)

7.3.21.11. Morphine Tolerance, Therapeutic (Antiociceptive) Effects

Some studies of rodents have sought to determine if the sexes differ with regard to morphine tolerance. As shown in Table 7.3.21.11, the results have been conflicting.

Table 7.3.21.11. Morphine tolerance, therapeutic (antinociception) effects.

Nature of Any Dif-ference					Postpubertal	
						Adult
More in males						**RODENT** *Rat*: AC Barrett et al. 2001; South et al. 2001 (co-infused with chloramphenicol, hot plate test)
No signif. difference						**RODENT** *Mouse*: BH Ali et al. 1995* (hot plate and abdominal constriction tests); *Rat*: Ali et al. 1995* (hot plate and abdominal constriction tests); Kalinichev et al. 2001 (maternal separation P2-14 animals); JR Holtman et al. 2004 (tail flick test)
More in females						**RODENT** *Mouse:* E Hopkins et al. 2004 (tail flick test after 3 days of intrathecal morphine injections); Kest et al. 2000

7.3.21.12. Morphine Tolerance, Effects of Stress

In one study, no sex difference was reported in the likelihood of developing tolerance to morphine in adulthood by rats who were subjected to the stress of maternal separation early in life (Table 7.3.21.12).

Table 7.3.21.12. Morphine tolerance, effects of stress.

Nature of Any Difference					Postpubertal	
						Adult
More in males						
No signif. difference						**RODENT** *Rat*: M Kalinichev et al. 2001 (maternal separation P2-14 animals)
More in females						

7.3.21.13. Morphine Withdrawal, Effects on Withdrawal Symptoms

In the one located study, male rats were found to exhibit more severe withdrawal symptoms than was the case for female rats (Table 7.3.21.13).

Table 7.3.21.13. Morphine withdrawal, effects on withdrawal symptoms.

Nature of Any Difference					Postpubertal	
						Adult
Greater in males						**RODENT** *Rat*: TJ Cicero et al. 2002 (after cessation of chronic morphine)
No signif. difference						
Greater in females						

7.3.22. Responses to Nalbuphine

Nalbuphine (nalbuphine hydrochloride) is a synthetic opioid used commercially as an analgesic under a variety of trade names, including Nubain. This drug is a mixed mu/kappa receptor opioid agonist. Studies of gender differences in responses to Nalbuphine are reviewed below.

7.3.22.1. Nalbuphine Exposure, Therapeutic (Antinociceptive) Effects

Even though one study of humans found nalbuphine to be more effective in suppressing pain perception in females than in males, the exact opposite pattern has been documented in most studies of nociception in rats (Table 7.3.22.1).

Table 7.3.22.1. Nalbuphine, Therapeutic (antinocieptive) effects.

Nature of Any Difference					Postpubertal	
						Adult
Greater in males						**RODENT** *Rat*: Terner et al. 2003 (warm water tail withdrawal test); Terner et al. 2002 (warm water tail withdrawal test); AC Barrett et al. 2002 (mechanical nociceptive stimulus application); CD Cook et al. 2000 (warm water tail withdrawal test with low stimulus intensity); RM Craft & Bernal 2001 (tail withdrawal and hot plate test)
No signif. difference						**RODENT** *Rat*: AC Barrett et al. 2002 (mechanical nociceptive stimulus application)
Greater in females						**NORTH AMERICA** *United States*: RW Gear et al. 1999 (at lower doses)

7.3.22.2. Nalbuphine Exposure, Effects on Locomotion

One study, using rats, failed to identify any significant sex differences in the effects of nalbuphine on the suppression of locomotor activity (Table 7.3.22.2).

Table 7.3.22.2. Nalbuphine exposure, effects on locomotion.

Nature of Any Difference						
					Postpubertal	
						Adult
Greater in males						
No signif. difference						**RODENT** *Rat*: RM Craft & Bernal 2001 (no difference in suppression of locomotor activity)
Greater in females						

7.3.22.3. Nalbuphine Exposure, Effects on Diuresis

In the one study found, no significant sex differences were reported in the extent to which nalbuphine induced urination (Table 7.3.22.3).

Table 7.3.22.3. Nalbuphine exposure, effects on diuresis.

Nature of Any Difference						
					Postpubertal	
						Adult
Greater in males						
No signif. difference						**RODENT** *Rat*: RM Craft & McNeil 2003 (equal diuretic effect)
Greater in females						

7.3.23. Responses to Nitrous Oxide

Nitrous oxide is a weak general anesthetic, and is generally not used alone in anesthesia. However, it has a very low short-term toxicity and is very useful as an analgesic. Sex difference research surrounding this drug is reviewed below.

7.3.23.1. Nitrous Oxide Exposure, Speed of Recovery From

One study suggested that females regained consciousness sooner after receiving nitrous oxide than did males (Table 7.3.23.1).

Table 7.3.23.1. Nitrous oxide exposure, speed of recovery from.

Nature of Any Difference						
					Postpubertal	
						Adult
Sooner in males						
No signif. diff.						
Sooner in females						**NORTH AMERICA** *United States*: Gan et al. 1999

7.3.24. Responses to Norbinaltorphimine

Norbinaltorphimine is a kappa receptor opioid antagonist, and thus blocks an organism's therapeutic response to kappa receptor agonists. Sex differences in responses to norbinaltorphimine are reviewed below.

7.3.24.1. Norbinaltorphimine Exposure, Antagonism of the Therapeutic Effects of Various Opiates on Antinociception/Analgesia

In laboratory animals, norbinaltorphimine has been found to be equally effective in males and females in antagonizing the antinociceptive and analgesic effects of various opiates (Table 7.3.24.1).

Table 7.3.24.1. Norbinaltorphimine exposure, antagonism of the therapeutic effects of various opiates on antinociception/analgesia.

Nature of Any Difference					Postpubertal	
						Adult
Greater in males						
No signif. difference						**RODENT** *Deer Mouse:* Kavaliers et al. 1998 (insensitivity to the antagonism of analgesia induced by 5 minute exposure to biting-flies); *Rat*: Craft et al. 2001 (blockade of U69,593 antinociceptive effects); *Mouse:* Mogil et al. 1997 (hind paw sensitivity to pain after treatment); Kavaliers & Choleris 1997 (insensitivity to the antagonistic effects of norbinaltorphimine on analgesia induced by exposure to 2-propylithiethane-a major component of weasel odor)
Greater in females						

7.3.24.2. Norbinaltorphimine Exposure, Effects on Diuresis

The one available study showed that the administration of norbinaltorphimine to male and female rats was equally successful at blocking the induction of urination by various opioid agonists (Table 7.3.24.2).

Table 7.3.24.2. Norbinaltorphimine exposure, effects on diuresis.

Nature of Any Difference					Postpubertal	
						Adult
Greater blockage in males						
No signif. difference						**RODENT** *Rat*: RM Craft & McNeil 2003 (blockade of nalbuphine, butorphanol & pentazocine induced diuresis)
Greater blockage in females						

7.3.25. Responses to Pentazocine

Pentazocine is a synthetically-prepared narcotic drug used to treat mild to moderate pain. It is a kappa receptor opioid agonist. Studies of sex differences in responses to this drug are reviewed in the following subsection.

7.3.25.1. Pentazocine Exposure, Therapeutic (Antinociceptive) Effects

In general, the antinociceptive effects of pentazocine are greater in males than females. This, however, is dependent on the nociceptive task that is used (Table 7.3.25.1).

Table 7.3.25.1. Pentazocine exposure, therapeutic (antinociception) effects.

Nature of Any Difference					Postpubertal	
						Adult
Greater in males						**RODENT** *Rat*: JM Terner et al. 2003 (tail withdrawal warm water bath); RM Craft & Bernal 2001* (tail withdrawal test)
No signif. difference						**RODENT** *Rat*: RM Craft Craft & Bernal 2001* (hot plate test)
Greater in females						**NORTH AMERICA** *United States*: RW Gear 1996b (postoperative analgesia)

7.3.25.2. Pentazocine Exposure, Effects on Diuresis

Table 7.3.25.2 suggests that among rats there is no sex difference in the likelihood of urination occurring with pentazocine treatment except in animals that are infused with excess levels of fluid.

Table 7.3.25.2. Pentazocine exposure, effects on diuresis.

Nature of Any Difference					Postpubertal	
						Adult
Greater urination in males						**RODENT** *Rat*: RM Craft & McNeil 2003* (water loaded animals)
No signif. difference						**RODENT** *Rat*: RM Craft et al. 2000 (animals matched for body weight); RM Craft & McNeil 2003* (animals with normal water consumption)
Greater urination in females						

7.3.25.3. Pentazocine Exposure, Effects on Locomotion

The one available study suggested that the sexes respond equally to pentazocine's effects on locomotor activity (Table 7.3.25.3).

Table 7.3.25.3. Pentazocine exposure, effects on locomotion.

Nature of Any Difference					Postpubertal	
						Adult
Greater in males						
No signif. difference						**RODENT** *Rat*: RM Craft & Bernal 2001
Greater in females						

7.3.26. Responses to Profofol

Profofol is a short-acting drug known for its hypnotic-like pain relieving effects. Research pertaining to how males and females may respond differently to profofol is reviewed below.

7.3.26.1. Profofol Exposure, Speed of Regaining Consciousness From

After being administered profofol, one study found females regaining consciousness sooner than males (Table 7.3.26.1).

Table 7.3.26.1. Profofol exposure, speed of regaining consciousness from.

Nature of Any Difference					Postpubertal	
						Adult
Sooner in males						
No signif. diff.						
Sooner in females						**NORTH AMERICA** *United States*: Gan et al. 1999

7.3.27. Responses to Spiradoline

Spiradoline is a kappa opioid receptor agonist. Studies of gender differences in responses to this drug are presented below.

7.3.27.1. Spiradoline Exposure, Therapeutic (Antinocipeptive) Effects

A couple of studies of rats reveal no sex differences in the antinociceptive effects of spiradoline when the drug was administered systemically, although when injected directly into the periaqueductal gray area, another study found a stronger antinociceptive effect in females than in males (Table 7.3.27.1).

Table 7.3.27.1. Spiradoline exposure, therapeutic (antinocipeptive) effects.

Nature of Any Difference					Postpubertal	
						Adult
Greater in males						
No signif. difference						**RODENT** *Rat:* JM Terner et al. 2003 (tail withdrawal warm water bath); AC Barrett et al. 2002 (mechanical nociceptive stimulus application)
Greater in females						**RODENT** *Rat:* RB Kanarek et al. 2001 (when injected into the periaquaductal gray)

7.3.28. Responses to U50,488

U50,488 is an opioid kappa receptor agonist that has been used experimentally in pain relief. Sex differences in response to this drug are summarized in the following tables.

7.3.28.1. U50,488 Exposure, Effects on Diuresis

The one study located on diuretic effects of U50,488 concluded that this experimental drug induced urination in female rats more than in males rats (Table 7.3.28.1).

Table 7.3.28.1. U50,488 exposure, effects on diuresis.

Nature of Any Difference					Postpubertal	
						Adult
Greater in males						
No signif. difference						
Greater in females						**RODENT** *Rat*: Craft et al. 2000 (inducement of diuresis when matched for body weight)

7.3.28.2. U50,488 Exposure, Effects on Locomotion

The one available study showed that in male and female rats, U50,488 is equally effective in suppressing locomotor activity (Table 7.3.28.2).

Table 7.3.28.2. U50,488 exposure, effects on locomotion.

Nature of Any Difference					Postpubertal	
						Adult
Greater in males						
No signif. difference						**RODENT** *Rat*: RM Craft & Bernal 2001
Greater in females						

7.3.28.3. U50,488 Exposure, Therapeutic (Antinociceptive) Effects

U50,488 exposure was found in one study to have greater antinociceptive effect in male rats than in female rats. However, most studies failed to find any significant sex difference (Table 7.3.28.3).

Table 7.3.28.3. U50,488, exposure, therapeutic (antinocipeptive) effects.

Nature of Any Difference					Postpubertal	
						Adult
Greater in males						**RODENT** *Rat*: RM Craft & Bernal 2001* (tail withdrawal test)
No signif. difference						**RODENT** *Mouse*: Sternberg et al. 2004 (antagonism of U50,488 analgesia by MK-801 when comparing senescent females to males); *Rat*: RM Craft & Bernal 2001* (hot plate test); AC Barrett et al. 2002 (mechanical nociceptive stimulus application); RM Craft et al. 2001 (antagonism of the antinociceptive effects by norbinaltorphimine, beta-funaltrexamine, & naltrindole)
Greater in females						

7.3.29. Responses to U69,593

U69,593 is an experimental kappa receptor opioid agonist. Research pertaining to differences in the effects of this drug on males and females is reviewed below.

7.3.29.1. U69,593 Exposure, Effects on Diuresis

Administration of U69,593 induces urination in both male and female rats. The available research is somewhat inconsistent regarding any sex difference in this regard, however (Table 7.3.29.1).

Table 7.3.29.1. U69,593 exposure, effects on diuresis.

Nature of Any Difference					Postpubertal	
						Adult
Greater in males						**RODENT** *Rat*: Craft et al. 1998 (urine output/dose)
No signif. difference						**RODENT** *Rat*: RM Craft et al. 2000 (controlled for body weight)
Greater in females						

7.3.29.2. U69,593 Exposure, Effects on Locomotion

The one study located on how U69,593 affects locomotor activity concluded that its effects did not differ in male and female rats. U69,593 is equally successful suppressing locomotor activity in both sexes (Table 7.3.29.2).

Table 7.3.29.2. U69,593 exposure, effects on locomotion.

Nature of Any Difference					Postpubertal	
						Adult
Suppressed more in males						
No signif. difference						**RODENT** *Rat*: RM Craft & Bernal 2001
Suppressed more in females						

7.3.29.3. U69,593 Exposure, Therapeutic (Antinociceptive) Effects

In rats, U69,593 seems to have a greater antinociceptive effect in male rats, but only when tested on the tail withdrawal task. Only when the drug was injected directly into the periaqueductal gray area was it more effective in suppressing nociception in females. Under other conditions, no significant sex difference in therapeutic response could be detected (Table 7.3.29.3).

Table 7.3.29.3. U69,593 exposure, therapeutic (antinociceptive) effects.

Nature of Any Difference					Postpubertal	
						Adult
Greater in males						**RODENT** *Rat*: RE Bartok & Craft 1997* (tail withdrawal test); RM Craft & Bernal 2001 (tail withdrawal test)
No signif. difference						**RODENT** *Rat*: RE Bartok & Craft 1997* (hot plate test); AC Barrett et al. 2002 (mechanical nociceptive stimulus application); RM Craft et al. 2001 (antagonism of the antinociceptive effects by norbinaltorphimine); RM Craft et al. 1998 (hot plate antinociception test); RM Craft & Bernal 2001 (hot plate test)
Greater in females						**RODENT** *Rat*: SA Tershner et al. 2000 (microinjected into the ventrolateral periaqueductal gray)

7.3.30. Responses to Vecuronium

Vecuronium (Norcuron) is a medication used to produce muscle relaxation particularly during surgery. Research undertaken to assess sex differences in response to vecuronium is reviewed below.

7.3.30.1. Vecuronium Exposure, Effects on Muscular Relaxation

One study of humans found that administering vecuronium induced more muscular relaxation in females than in males (Table 7.3.30.1).

Table 7.3.30.1. Vecuronium exposure, effects on muscular relaxation.

Nature of Any Difference					Postpubertal	
						Adult
Greater in males						
No signif. diff.						
Greater in females						**ASIA** *China*: Xue et al. 1998

7.4

RESPONSES TO ALCOHOL

The single most widely used recreational drug is alcohol. For a significant minority of users, this drug is highly addictive (see Chapter 5 for a review of evidence concerning sex differences in alcohol addiction). Due in part to its addictive potential, alcohol consumption is illegal in several countries and its use is restricted to adults in nearly all other countries. Below are summaries of findings surrounding sex differences in response to the ingestion of alcohol.

7.4.1. Behavioral Responses to Alcohol

Studies of sex differences in the behavioral responses to alcohol are reviewed in the following subsection.

7.4.1.1. Alcohol Exposure, Effects on Activity Level

Various types of general activity can be altered by exposure to alcohol. Table 7.4.1.1 suggests that it is difficult to generalize about any gender differences in this regard. There appear to be species differences as well as dosage and the type of activity measured that influence a study's findings.

Table 7.4.1.1. Alcohol exposure, effects on activity level.

Nature of Any Difference					Postpubertal	
						Adult
Males increased more/decreased less						**RODENT** *Mouse*: Middaugh et al. 1992* (young, more after low dosage)
No signif. difference						**RODENT** *Rat*: Overstreet et al. 2004 (plus-maze activity after chronic exposure)
Females increased more/decreased less						**RODENT** *Mouse*: Middaugh et al. 1992* (young, more after high dosage)

7.4.1.2. Alcohol Exposure, Effects on Ataxia

The one study located on the effects of alcohol on ataxia showed that in adult rats, males exhibited greater degree of ataxia than did females. Stress, which tends to exaggerate alcohol-induced ataxia in rats, appeared to affect alcohol induced ataxia to an equal degree in males and females (Table 7.4.1.2).

Table 7.4.1.2. Alcohol exposure, effects on ataxia.

Nature of Any Difference					Postpubertal	
						Adult
Greater in males						**RODENT** *Rat*: Tayyabkhan et al. 2002*
No signif. difference						**RODENT** *Rat*: Tayyabkhan et al. 2002* (effects of stress on ataxia after ethanol exposure)
Greater in females						

7.4.1.3. Alcohol Exposure, Effects on Licking/Self-Grooming Behavior

Some animals engage in increased licking and self-grooming after consuming alcohol. According to Table 7.4.1.3, male rats appear to respond to alcohol with such behavior to a greater extent that female rats.

Table 7.4.1.3. Alcohol exposure, effects on licking behavior/self-grooming behavior.

Nature of Any Difference					Postpubertal	
						Adult
Greater in males						**RODENT** *Rat*: van Haaren & Anderson 1994
No signif. difference						
Greater in females						

7.4.1.4. Alcohol Exposure, Effects on Righting Reflex

After consuming substantial amounts of alcohol, all animals have difficulty maintaining their balance; thus, they do not exhibit a normal righting reflex. One study among rats indicated that in juvenile rats, there is no sex difference in the latency to lose the righting response (i.e., turning from supine to prone) following the administration of alcohol. However, males were found to take longer than females to regain this response once it is suppressed (Table 7.4.1.4).

Table 7.4.1.4. Alcohol exposure, effects on righting reflex.

Nature of Any Difference					Postpubertal	
					Adolescent	
Males more impaired					**RODENT** *Rat*: B Webb et al. 2002* (later return of righting reflex with acute injection)	
No signif. difference					**RODENT** *Rat*: B Webb et al. 2002* (time until the righting reflex is lost with acute injection)	
Females more impaired						

7.4.1.5. Alcohol Exposure, Effects on Social Behavior

Social behavior is sometimes increased and other times decreased by alcohol consumed, partly depending on the quantity consumed. In terms of sex differences, two studies using rats indicated that acute exposure to alcohol facilitated social behavior to a greater degree in females than in males. However, two studies of rats in which alcohol was administered chronically revealed no significant sex differences in subsequent social behavior (Table 7.4.1.5).

Table 7.4.1.5. Alcohol exposure, effects on social behavior.

Nature of Any Difference					Postpubertal	
						Adult
Males increased more/suppressed less						
No signif. difference						**RODENT** *Rat*: Overstreet et al. 2002 (chronic consumption); Overstreet et al. 2004 (social interaction)
Females increased more/suppressed less						**RODENT** *Rat*: Kelly & Dillingham 1994 (increased after acute consumption); Varlinskaya & Spear 2004 (suppressed less after acute consumption)

7.4.1.6. Alcohol Exposure, Effects on Subjective Response

Subjective responses to alcohol largely pertain to the extent to which individuals feel high or intoxicated. As shown in Table 7.4.1.6, most studies have found females feeling higher than males after consuming comparable amounts of alcohol. In some studies, the amount of alcohol consumed was adjusted for body size.

Table 7.4.1.6. Alcohol exposure, effects on subjective response.

Nature of Any Difference					Postpubertal		Multiple Age Categories
						Adult	
Greater in males							
No signif. difference							**NORTH AMERICA** *United States*: Lucey et al. 1999
Greater in females						**NORTH AMERICA** *United States*: Goist & Sutker 1985 (young)	**NORTH AMERICA** *United States*: Frezza et al. 1990; Mercer & Khavari 1990; JL York & Biederman 1991; JL York & Welte 1994

7.4.2. Biochemical Responses to Alcohol

The body responds to alcohol exposure in a variety of ways, several of which involve alterations in various biochemicals. Findings of sex differences in these responses are reviewed in the following subsection.

7.4.2.1. Alcohol Exposure, Effects on Adrenocorticotropin Release

According to one study, in adult rats, adrenocorticotropin, an important hormone in the stress-response pathway, is released to a greater degree in males than in females following administration of alcohol (Table 7.4.2.1).

Table 7.4.2.1. Alcohol exposure, effects on adrenocorticotropin release.

Nature of Any Difference					Postpubertal	
					Adolescent	
Greater in males					**RODENT** *Rat*: C Rivier 1999 (greater secretion of adrenocorticotropin hormone in plasma in response to acute alcohol injection)	
No signif. difference						
Greater in females						

7.4.2.2. Alcohol Exposure, Effects on Adrenaline and Noradrenaline Levels

The one study reviewed showed that in adult rats, alcohol administration, when combined with a stress-inducing stimulus (hypothermia), led to a more rapid release of adrenaline and noradrenaline in females than in males. However, once released, there was no significant sex difference in the levels of these hormones circulating in the blood stream (Table 7.4.2.2).

Table 7.4.2.2. Alcohol exposure, effects on adrenaline and noradrenaline levels.

Nature of Any Difference					Postpubertal	
						Adult
Greater in males						
No signif. difference						**RODENT** *Rat*: Hirvonen & Huttunen 1995* (levels of adrenaline and noradrenaline in urine after 2 hours of hypothermia with previous ethanol exposure)
Greater in females						**RODENT** *Rat*: Hirvonen & Huttunen 1995* (earlier increase in adrenaline and noradrenaline in serum and urine after ethanol exposure when placed in a cold environment)

7.4.2.3. Alcohol Exposure, Effects on Aldehyde Dehydrogenase Activity

One of the breakdown products of alcohol is aldehyde, and aldehyde dehydrogenase is a crucial enzyme used to break down alcohol. According to one study, there is no sex difference in activity of this enzyme in the brain following administration of alcohol to rats (Table 7.4.2.3).

Table 7.4.2.3. Alcohol exposure, effects on aldehyde dehydrogenase activity.

Nature of Any Difference					Postpubertal	
						Adult
Greater in males						
No signif. difference						**RODENT** *Rat:* Y Inoue et al. 1981 (in the brains of naive low and high ethanol preferring rats)
Greater in females						

7.4.2.4. Alcohol Exposure, Effects on Corticosterone

The hormone corticosterone, according to studies using rats, is elevated more in females than in males by the consumption (or injection) of alcohol (Table 7.4.2.4).

Table 7.4.2.4. Alcohol exposure, effects on corticosterone.

Nature of Any Difference					Postpubertal	
						Adult
Greater in males						
No signif. differ.						**RODENT** *Rat*: C Rivier 1999 (plasma levels, alcohol injected)
Greater in females						**RODENT** *Rat*: Olgilvie & Rivier 1997 (plasma levels in response to acute alcohol injection); Rivier 1993; MA Wilson et al. 2004 (during plus maze activity & during a defensive prod-burying task)

7.4.2.5. Alcohol Exposure, Effects on Dopamine Levels

Several studies of rodents have sought to determine if alcohol alters the brain's dopaminergic system in ways that differ according to sex. As shown in Table 7.4.2.5, the findings have not been consistent, varying according to regions of the brain, amounts of alcohol consumed, and species (and even strain of species) investigated.

Table 7.4.2.5. Alchol exposure, effects on dopamine levels.

Nature of Any Difference					Postpubertal	
						Adult
Males increase more						**RODENT** *Mouse*: E Boone et al. 1997* (C57BL/6 strain; in the caudate)
No signif. difference						**RODENT** *Mouse*: E Boone et al. 1997* (C57BL/6 strain, in the nucleus accumbens); *Rat*: BA Blanchard et al. 1993* (acute exposure, in the striatum); BA Blanchard & Glick 1995* (acute exposure, extracellular levels in the striatum)
Females increase more						**RODENT** *Mouse*: E Boone et al. 1997 (DBA/2J, in nucleus accumbens); *Rat*: BA Blanchard et al. 1993* (levels in the nucleus accumbens); BA Blanchard & Glick 1995* (acute exposure, levels in the nucleus accumbens)

7.4.2.6. Alcohol Exposure, Effects on GABA_A

Alcohol consumption can lead to changes in the function of the CNS as reflected in alterations in GABA_A levels. The studies reviewed suggest that for adult rats, complex sex differences exist in CNS GABA_A responses to alcohol (Table 7.4.2.6.).

Table 7.4.2.6. Alcohol exposure, effects on GABA_A.

Nature of Any Difference					Postpubertal
Greater in males					**RODENT** *Rat*: Devaud et al. 1997 (greater decrease in cortical levels of the GABA_A alpha$_1$ subunit peptide with ethanol dependence); Devaud et al. 1999:841* (chronic ethanol, in GABA_A alpha 4 subunit peptide levels in the hypothalamus)
No signif. difference					**RODENT** *Rat*: Devaud et al. 1999:841* (chronic ethanol, in GABA_A alpha 3 subunit peptide levels in the hypothalamus)
Greater in females					**RODENT** *Rat*: Devaud & Morrow 1999:331 (ethanol dependent rats, increased NR1 NMDA receptor subunit levels in the hypothalamus); Devaud et al. 1999:841* (chronic ethanol, in GABA_A alpha 2 subunit peptide levels in the hypothalamus)

7.4.3. Cognitive and Emotional Responses to Alcohol

Because alcohol affects the brain (see above), it is not surprising that cognition and emotionality will be impacted as well. Reviewed below are studies that sought to address whether sex differences are present in measures of emotional tone and cognitive ability.

7.4.3.1. Alcohol Exposure, Effects on Anxiety

One study using rats indicated that males exhibited greater apparent nervousness than did females after repeatedly consuming alcohol (Table 7.4.3.1). However, the same study failed to find a sex difference in elevated plus maze performance (which is often considered a indicator of anxiety) as a result of certain alcohol exposure regimens.

Table 7.4.3.1. Alcohol exposure, effects on anxiety.

Nature of Any Difference					Postpubertal
					Adult
Greater in males					**RODENT** *Rat*: Overstreet et al. 2004 * (anxiety after five days ethanol exposure)
No signif. difference					**RODENT** *Rat*: Overstreet et al. 2004* (elevated plus maze behavior after chronic cyclical ethanol exposure)
Greater in females					

7.4.3.2. Alcohol Exposure, Effects on Learning

The studies reviewed in Table 7.4.3.2 pertain to the ability of rats to learn under the influence of alcohol. The findings inconsistent sex difference in this ability. This is likely due to differences in the task parameters.

Table 7.4.3.2. Alchol exposure, effects on learning.

Nature of Any Difference					Postpubertal
					Adult
Males impaired more					**RODENT** *Rat*: Savage et al. 2000* (delay-independent impairment on delayed matching-to-position task-chronic ethanol treatment)
No signif. difference					
Females impaired more					**RODENT** *Rat*: Maier & Phorecky 1986 (impairment in ability to shift strategies); Savage et al. 2000* (delay-dependent impairment on delayed matching-to-position task-chronic ethanol treatment)

7.4.3.3. Alcohol Exposure, Effects on Memory

According to one study, alcohol exposure results in longer time intervals between introduction to an object and evidence of recalling the physical location of the object for male rats than for female rats (Table 7.4.3.3). This suggests that spatial memory may be more impaired in males than in females with alcohol exposure.

Table 7.4.3.3. Alcohol exposure, effects on memory.

Nature of Any Difference						Postpubertal
						Adult
Greater in males impaired						**RODENT** *Rat*: Savage et al. 2000* (object location memory, chronic exposure)
No signif. difference						
Greater in females impaired						

7.4.4. Neurological Responses to Alcohol

Once consumed, alcohol enters the circulatory system and passes into the brain. Its effects on both the structure and functioning of the brain are numerous. Sex differences in various neurological effects of alcohol are reviewed in the following subsection.

7.4.4.1. Alcohol Exposure, Effects on Brain Alcohol Levels

The two studies of rats that sought to determine if a sex difference was detectable in the amount of alcohol that reached the brain after equal consumption levels concluded that there was no difference (Table 7.4.4.1).

Table 7.4.4.1. Alcohol exposure, effects on brain alcohol levels.

Nature of Any Difference						Postpubertal
						Adult
Greater in males						
No signif. difference						**RODENT** *Rat:* CA Wilson et al. 2004; MA Wilson et al. 2004 (with equal acute ethanol treatment)
Greater in females						

7.4.4.2. Alcohol Exposure, Effects on the Amygdala

Alcohol consumption can lead to changes in the function of the amygdala. The one study located showed that in adult rats, the DNA content was reduced to a greater extent in the amygdala of males than females (Table 7.4.4.2).

Table 7.4.4.2. Alcohol exposure, effects on the amygdala.

Nature of Any Difference						Postpubertal
						Adult
Greater decrease in males						**RODENT** *Rat:* SJ Kelly & Dillingham 1994 (DNA content with 5g/kg/day alcohol)
No signif. difference						
Greater decrease in females						

7.4.4.3. Alcohol Exposure, Gray Matter Reduction

Long-term consumption of even moderate amounts of alcohol has been shown to reduce the amount of gray matter in the brain. Somewhat inconsistent evidence has been reported regarding a possible sex difference in this effect (Table 7.4.4.3).

Table 7.4.4.3. Alcohol exposure, gray matter reduction.

Nature of Any Dif-ference						Postpubertal
						Adult
Greater reduction in males						**ASIA** *Japan*: Taki et al. 2004 (moderate lifetime consumption)
No signif. difference						**EUROPE** *Netherlands*: de Bruin et al. 2005 (moderate lifetime consumption)
Greater reduction in females						

7.4.4.4. Alcohol Exposure, Effects on the Hippocampus

Long-term alcohol consumption can lead to changes in the function of the hippocampus, with studies on adult rats showing no sex differences in toxicity when studied *in vitro*. *In vivo* alterations (in the composition of the NMDA receptor) have been shown more in males than females (Table 7.7.4.4).

Table 7.4.4.4. Alcohol exposure, effects on the hippocampus.

Nature of Any Difference					Postpubertal	
						Adult
Greater in males						**RODENT** *Rat*: Devaud & Morrow 1999:331 (ethanol dependent rats, greater increase in NR1 and NR2A NMDA receptor subunit levels)
No signif. difference						**RODENT** *Rat*: Prendergast et al. 2000 (CA1 hippocampal cytotoxicity, in slice explants, after long term exposure)
Greater in females						

7.4.4.5. Alcohol Exposure, Effects on the Cortex

Alcohol consumption can lead to changes in the function of the cortex. For studies reviewed using adult rats, both sex differences and no sex differences are present depending on the cortical variable measured (Table 7.4.4.5).

Table 7.4.4.5. Alcohol exposure, effects on the cortex.

Nature of Any Difference					Postpubertal	
						Adult
Greater in males						**RODENT** *Rat*: LM Savage et al. 2000 (accelerated neuropathology with chronic ethanol treatment)
No signif. difference						**RODENT** *Rat*: Devaud & Morrow 1999: 331 (ethanol dependent rats increase in NR2B NMDA receptor subunit levels)
Greater in females						**RODENT** *Rat*: Devaud & Morrow 1999:331 (ethanol dependent rats - increase NR1 NMDA receptor subunit levels); E Witt et al. 1986 (chronic ethanol exposure number of muscarinic binding sites in cortex)

7.4.4.6. Alcohol Exposure, Effects on Muscarinic Binding Sites in the Striatum

According to one study, heavy prolonged alcohol consumption lead to an increase in the number of muscarinic binding sites in the striatum (Table 7.7.4.6).

Table 7.4.4.6. Alcohol exposure, effects on muscarinic binding sites in the striatum.

Nature of Any Difference					Postpubertal	
						Adult
Greater in males						**RODENT** *Rat*: E Witt et al. 1986 (chronic ethanol exposure, number of muscarinic binding sites in striatum)
No signif. difference						
Greater in females						

7.4.5. Physiological Responses to Alcohol

Sex differences in various physiological responses (with the exception of neurological responses) to alcohol are reviewed in the following sub-section.

7.4.5.1. Alcohol Exposure, Effects on Blood Alcohol Levels

Findings have not been consistent with respect to any sex differences in how alcohol consumption affects blood alcohol level (Table 7.4.5.1).

Table 7.4.5.1. Alcohol exposure, effects on blood alcohol levels.

Nature of Any Difference					Postpubertal	
					Adolescent	Adult
Males higher						**RODENT** *Rat*: van Haaren & Anderson 1994 (fixed interval schedule of ethanol availability)
No signif. difference					**PRIMATE (EXCEPT APE)** *Rhesus Macaque*: AJ Bennett & DePetrillo 2004 (blood ethanol content) **RODENT** *Rat*: B Webb et al. 2002	**PRIMATE (EXCEPT APE)** *Macaca fascicularis*: KA Grant et al. 2000 **RODENT** *Rat*: ME Jung et al. 1999 (after acute ethanol treatment); Iimuro et al. 1997 (4 week intragastric feeding, mean ethanol concentrations)
Females higher						**NORTH AMERICA** *United States*: Frezza et al. 1990 (adjustment for body weight) **RODENT** *Rat*: Mezey et al. 1992 (adjustment for body weight); Rivier 1993 (adjustment for body weight)

7.4.5.2. Alcohol Exposure, Effects on Elimination Rate

Among juveniles, the elimination of alcohol and its breakdown products occurs at the same rate for both sexes. In adults, however, one study of rodents suggested that males eliminate alcohol slower than females, while a second study found no significant difference (Table 7.4.5.2).

Table 7.4.5.2. Alcohol exposure, effects on elimination rate.

Nature of Any Difference					Postpubertal	
					Adolescent	Adult
Greater reduction in males						**RODENT** *Rat*: Varlinskaya & Spear 2004 (slower elimination rate)
No signif. difference					**RODENT** *Rat*: B Webb et al. 2002 **PRIMATE (EXCEPT APE)** *Rhesus macaque*: AJ Bennett & DePetrillo 2004	**RODENT** *Rat*: Iimuro et al. 1997 (4 week intragastric feeding)
Greater reduction in females						

7.4.5.3. Alcohol Exposure, Effects on Facial Flushing

Facial flushing refers to the tendency for one's face to feel warm and appear reddened. According to all available research on humans, females experience greater facial flushing than do males after consuming alcohol (Table 7.4.5.3).

Table 7.4.5.3. Alcohol exposure, effects on facial flushing.

Nature of Any Difference						Postpubertal
						Adult
Greater in males						
No signif. difference						
Greater in females						**EUROPE** *Britain*: RJ Ward et al. 1994; *Multiple European Countries*: RJ Ward et al. 1998 (3/3 countries) **OCEANIA** *Australia*: Whitfield & Martin 1993

7.4.5.4. Alcohol Exposure, Effects on Hypothermia

The consumption of alcohol tends to cause a decrease in body temperature. Table 7.4.5.4 shows that one study of rats concluded that exposure to fairly large amounts of alcohol resulted in a greater decline in the body temperature of females than in males. Another study suggested that females are also slower than males with regard to recovering from an alcohol-induced reduction in body temperature (Table 7.4.5.4).

Table 7.4.5.4. Alcohol exposure, effects on hypothermia.

Nature of Any Difference					Postpubertal	
					Adolescent	Adult
Greater drop and slower recovery in males						
No signif. difference						
Greater drop and slower recovery in females					**RODENT** *Rat*: Webb et al. 2002 (acute exposure, recovery rate)	**RODENT** *Rat*: Hirvonen & Huttunen 1995 (drop after ethanol exposure when placed in a cold environment)

7.4.5.5. Alcohol Exposure, Effects on the Heart

One study reported somewhat complex effects of alcohol on heart function, some of which may be sex-related (Table 7.4.5.5).

Table 7.4.5.5. Alcohol exposure, effects on the heart.

Nature of Any Difference						Postpubertal
						Adult
Greater in males						**RODENT** *Rat:* RH Kennedy & Liu 2003* (14 month ethanol exposure L-type Ca^{2+} peak amplitude and maximum conductance in cardiomyocytes)
No signif. difference						**RODENT** *Rat:* RH Kennedy & Liu 2003* (14 month ethanol exposure L-type Ca^{2+} in steady-state activation or inactivation in cardiomyocytes)
Greater in females						

7.4.5.6. Alcohol Exposure, Damaging Effects on the Liver

Consumption of large quantities of alcohol leads to liver damage. Most of the experiments with rats suggest that this damage may be more severe for females than for males, although several qualifications are suggested by the available evidence (Table 7.4.5.6).

Table 7.4.5.6. Alcohol exposure, damaging effects on the liver.

Nature of Any Difference					Postpubertal	
						Adult
Greater in males						**RODENT** *Rat*: Siegers et al. 1984* (treatment with carbon tetrachloride and alcohol - increase liver aminotransferases, GOT& GPT, and sorbitol dehydrogenase activity content of hydroxyproline); Iimuro et al. 1997* (4 week intragastric feeding-greater damage in the centrilobular area)
No signif. difference						**RODENT** *Rat*: Siegers et al. 1984* (treatment with carbon tetrachloride and alcohol increase in liver triglyceride content); SH Yamada et al. 1999* (long term ethanol exposure with subsequent lipopolysaccharide exposure-levels of cytokine-induced monocyte chemoattractant protein)
Greater in females						**RODENT** *Rat*: Inoue et al. 1981 (higher activity of aliphatic and aromatic aldehyde in ethanol exposed rats with a high ethanol preference); Iimuro et al. 1997* (4 week intragastric feeding, greater elevation in aspartate aminotranserferase levels, steatosis, necrosis and inflammation in the liver, greater in the panlobular area); Iimuro et al. 1997* (4 week intragastric feeding-greater levels of endotoxin in plasma, intercellular adhesion molecule 1 expression in hepatic sinusoidal lining cells and number of infiltrating inflammatory cells in liver); SH Yamada et al. 1999* (long term ethanol exposure with subsequent lipopolysaccharide exposure-higher levels of cytokine-induced neutrophil-chemoattractant-1 in liver); DW Crabb et al. 1985 (greater activity of liver alcohol dehydrogenase with lesions of the periventricular hypothalamus)

7.4.5.7. Alcohol Exposure, Effects on Metabolism

Alcohol metabolism refers to the speed with which alcohol is broken down into is metabolites once ingested. Table 7.4.5.7 indicates that studies have reached different conclusions about the speed with which alcohol is metabolized by males and females.

Table 7.4.5.7. Alcohol exposure, effects on metabolism.

Nature of Any Difference					Postpubertal		Multiple Age Categories
					Adolescent	Adult	
More rapid & complete in males						**NORTH AMERICA** *United States*: BM Jones & Jones 1976; Frezza et al. 1990:97 (gastric first-pass metabolism); Ammon et al. 1996 (acetaldehyde excretion)	
No signif. difference					**RODENT** *Rat*: B Webb et al. 2002	**EUROPE** *Britain*: M Arthur et al. 1984 (young, acetaldehyde excretion) **NORTH AMERICA** *United States*: Vessol et al. 1971 (young, acetaldehyde excretion); Azevedo et al. 1974 (acetaldehyde excretion); Dubowski 1976 (acetaldehyde excretion); BM Jones & Jones 1976 (elimination rates); AW Marshall et al. 1983 (acetaldehyde elimination rate); Sutker et al. 1983 (elimination rates); Arthur et al. 1984 (acetaldehyde elimination rate); Goist & Sutker et al. 1985 (elimination rates); Sutker et al. 1987 (blood levels); Frezza et al. 1990 (elimination rates); Glomberg et al. 1993 (blood levels); Kevo et al. 1998 (young, blood levels)	
More rapid & complete in females						**NORTH AMERICA** *United States*: Arthur et al. 1984; Mishra et al. 1989 (young); Frezza et al. 1990; Thomasson 1995 (acetaldehyde excretion); Beard et al. 1998 (college); Blekher et al. 2002 (college) **RODENT** *Rat*: Buttner et al. 1965; Eriksson & Malmstrom 1967; Eriksson 1973; Rachamin et al. 1980; JR Wilson et al. 1984	**RODENT** *Rat*: AC Collins et al. 1975; Rachamin et al. 1980; Vanderhoeven et al. 1990; Mankes et al. 1991

7.4.5.8. Alcohol Exposure, Physiological Depressant Effects

Physiological depression refers to a general slow-down of most bodily functions. The one study located pertaining to this effect indicated that among adult mice, alcohol has a larger depressive effect on males than on females (Table 7.4.5.8).

Table 7.4.5.8. Alcohol exposure, physiological depressant effects.

Nature of Any Difference					Postpubertal	
						Adult
Greater in males						**RODENT** *Mouse:* LD Middaugh et al. 1992 (C57Bl/6J strain)
No signif. difference						
Greater in females						

7.4.5.9. Alcohol Exposure, Effects on the Spleen

Alcohol consumption can lead to changes in the function of the spleen. For studies located based on studies of rats, complex detailed sex differences were reported (Table 7.4.5.9).

Table 7.4.5.9. Alcohol exposure, effects on the spleen.

Nature of Any Difference					Postpubertal	
						Adult
Greater in males						**RODENT** *Rat*: CJ Grossman et al 1993* (chronic exposure - greater increase in CD4 [T-helper cell immunoreactivity] in spleen cells)
No signif. difference						**RODENT** *Rat*: SH Yamada et al. 1999 (long term ethanol exposure with subsequent lipopolysaccharide exposure - levels of cytokine-induced neutrophil-chemoattractant-1); Grossman et al 1993* (chronic exposure -equal CD4/CD8 ratio in spleen cells)
Greater in females						**RODENT** *Rat*: CJ Grossman et al. 1993* (chronic exposure - greater reduction in spleen cell blastogenic response as compared to controls)

7.5
RESPONSES TO SEDATIVES

Drugs that have a calming effect on mood are generally classified as sedatives. Research on sex differences in response to these drugs are presented in the following section.

7.5.1. Responses to Baclofen

Baclofen is a drug typically used as a muscle relaxant, but is also sometimes used to help treat certain types of drug addition. Studies of sex differences in the effects of baclofen are reviewed below.

7.5.1.1. Baclofen Exposure, Effects on Cocaine Self-Administration

One study concluded that among rats, baclofen resulted in a greater reduction in cocaine self-administration in females than males (Table 7.5.1.1).

Table 7.5.1.1. Baclofen exposure, effects on cocaine self-administration.

Nature of Any Difference					Postpubertal	
						Adult
Greater decrease in males						
No signif. difference						
Greater decrease in females						**RODENT** *Rat:* UC Campbell et al. 2002

7.5.1.2. Baclofen Exposure, Effects on Morphine Abstinence Syndrome

As a drug sometimes used in the treatment of morphine addiction, baclofen was administered to mice who exhibited signs of morphine addiction. The one study reviewed found no sex difference in the extent to which baclofen alleviated morphine abstinence symptoms (Table 7.5.1.2)

Table 7.5.1.2. Baclofen exposure, effects on morphine abstinence syndrome.

Nature of Any Difference					Postpubertal	
						Adult
Greater in males						
No signif. difference						**RODENT** *Mouse:* SL Diaz et al. 2001
Greater in females						

7.5.2. Responses to Benzodiazepines

Benzodiazepines are substances that act as tranquilizers; the most commonly prescribed is Valium. Summarized below are studies that have sought to determine if males or females respond differently to benzodiazepines.

7.5.2.1. Benzodiazepine Exposure, Effects on Elevated Plus Maze

According to one study, there is no sex difference in exploratory behavior following administration of benzodiazepine to adult rats in a stress-inducing task. However, when this treatment is combined with perinatal exposure to alcohol, males show more reduced exploration (Table 7.5.2.1).

Table 7.5.2.1. Benzodiazepine exposure, effects on elevated plus maze.

Nature of Any Difference					Postpubertal	
						Adult
Greater reduction in males						**RODENT** *Rat*: J Osborn et al. 1998: 625* (combined with perinatal alcohol exposure, time spent in central area of a plus maze)
No signif. difference						**RODENT** *Rat*: J Osborn et al. 1998: 625* (plus maze exploration)
Greater reduction in females						

7.5.2.2. Benzodiazepine Exposure, Effects on Open Field Activity

According to one study of adult rats, the administration of benzodiazepine was equally effective in increasing male and female open field activity levels (Table 7.5.2.2).

Table 7.5.2.2. Benzodiazepine exposure, effects on open field activity.

Nature of Any Difference					Postpubertal	
Greater in males						
No signif. difference						**RODENT** *Rat*: J Osborn et al. 1998:625
Greater in females						

7.5.3. Responses to Diazepam

Diazepam is a tranquilizing drug usually used to treat manic depression, particularly during the manic phase of the disease. Some studies have sought to determine if males and females respond to diazepam differently. Results are summarized below.

7.5.3.1. Diazepam Exposure, Effects on Brain Levels of Diazepam

The one study that investigated how administering diazepam to adult rats affected their brain levels of diazepam concluded that there was no sex difference in this regard (Table 7.5.3.1).

Table 7.5.3.1. Diazepam exposure, effects on brain levels of diazepam.

Nature of Any Difference					Postpubertal	
						Adult
Greater in males						
No signif. difference						**RODENT** *Rat*: MA Wilson et al. 2004 (whole brain)
Greater in females						

7.5.3.2. Diazepam Exposure, Effects on Corticosterone

According to the available evidence, female rats generally have a greater decrease in plasma corticosterone levels with either acute or chronic diazepam exposure than do male rats, although no differences were found in one study conducted under conditions of high environmental stress (Table 7.5.3.2).

Table 7.5.3.2. Diazepam exposure, effects on corticosterone.

Nature of Any Difference				Postpubertal		
						Adult
Greater decrease in males						
No signif. difference						**RODENT** *Rat*: Stock et al. 2000* (plasma levels after exposure to an elevated plus maze with chronic diazepam pre-treatment)
Greater decrease in females						**RODENT** *Rat*: Stock et al. 2000* (plasma levels after exposure to an elevated plus maze with acute diazepam pre-treatment); Pericic et al. 1985 (1 mg/kg diazepam pretreatment greater decrease in plasma levels); Pericic & Pivae 1996 (treated with diazepam prior to fluid intake when unpunished or paired with a foot shock); Stock et al. 1999 (plasma levels after chronic diazepam or diazepam plus flumazenil)

7.5.3.3. Diazepam Exposure, Effects on Fear

The one available study failed to find any significant sex difference in fearful behavior among rats given diazepam (Table 7.5.3.3).

Table 7.5.3.3. Diazepam Exposure, effects on fear.

Nature of Any Difference					Postpubertal	
						Adult
Males reduce more						
No signif. difference						**RODENT** *Rat*: MA Wilson et al. 2004
Females reduce more						

7.5.3.4. Diazepam Exposure, Effects on Elevated Plus Maze Activity

Treatment with diazepam, a benzodiazepine receptor agonist, commonly used for its anxiolytic properties, should decrease anxiety in rats who are subjected to a stress-inducing exploration task. According to one study, females increased their time in the closed arms of the elevated plus maze, suggesting heightened anxiety, more after being administered diazepam than did males. The second studied reviewed contradicts this finding (Table 7.5.3.4).

Table 7.5.3.4. Diazepam exposure, effects of elevated plus maze activity.

Nature of Any Difference					Postpubertal	
						Adult
Greater in males						
No signif. difference						
Greater in females						**RODENT** *Rat*: H Stock et al. 2000 (closed arm entries); MA Wilson 2004 (increased open arm entries)

7.5.3.5. Diazepam Exposure, Effects on Locomotion

Administering diazepam to rats resulted in a greater reduction of locomotor activity in females than in males, according to one study (Table 7.5.3.5).

Table 7.5.3.5. Diazepam exposure, effects on locomotion.

Nature of Any Difference					Postpubertal	
						Adult
Greater reduction in males						
No signif. difference						
Greater reduction in females						**RODENT** *Rat*: CE Fisher & Hughes 1996 (greater reduction in walking with acute dose as compared to controls - no change in males)

7.5.3.6. Diazepam Exposure, Seizure Reduction With

In addition to being used to treat anxiety, diazepam has sometimes also been used as an anticonvulsant. Studies of rodents have indicated that males exhibited a greater reduction in seizures induced with seizure-inducing drugs than did females. In other words, females require exposure to greater amounts of diazepam or they required more exposure to the seizure-inducing drug before exhibiting comparable reductions in seizuring or convulsing than was true for males (Table 7.5.3.6).

Table 7.5.3.6. Diazepam exposure, seizure reduction with.

Nature of Any Difference	Postpubertal
	Adult
Seizures reduced more in males	**RODENT** *Mouse*: Pericic et al. 1986 (seizures induced with picrotoxin); *Rat*: Pericic & Pirae 1996 (seizures induced with bicuculline); Pericic & Beyas 1997 (hind limb convulsions induced with bicuculline)
No signif. difference	
Seizures reduced more in females	

7.5.3.7. Diazepam Exposure, Effects on Voluntary Motor Control

Among the side-effects of diazepam is that it tends to impair voluntary motor functioning. One study of rats concluded that this was more pronounced among males than females, while a study of humans reached the opposite conclusion (Table 7.5.3.7).

Table 7.5.3.7. Diazepam exposure, effects on voluntary motor control.

Nature of Any Difference	Multiple Age Categories
Impairment greater in males	**RODENT** *Rat*: CE Fisher & Hughes 1996 (locomotion)
No signif. difference	
Impairment greater in females	**NORTH AMERICA** *United States*: Palva 1985

7.6

RESPONSES TO SEIZURE INFLUENCING DRUGS

Drugs that are used to treat epilepsy and other seizure disorders are known as anticonvulsants. Below are findings of sex differences in responses to such medications. Also included in this section are studies pertaining to experimental drugs that seem to induce seizures.

7.6.1. Responses to Bicuculline

Bicuculline is a $GABA_A$ receptor antagonist that sometimes mimics the symptoms of epilepsy by inducing seizure. Rarely used on humans, this substance is primarily used to experimentally induce epileptic-like states in rodents for purpose of developing improved treatments for epilepsy.

7.6.1.1. Bicuculline Exposure, Effects on Myoclonic Twitching

According to one study, female rats required a higher dose of bicuculline to cause myoclonic twitching (a behavioral marker of seizure) than did male rats (Table 7.6.1.1).

Table 7.6.1.1. Bicuculline exposure, effects on myoclonic twitching.

Nature of Any Difference	Postpubertal
	Adolescent
Higher dosage required for males	
No significant difference	
Higher dosage required for females	**RODENT** *Rat*: Bujas et al. 1997

7.6.1.2. Bicuculline Exposure, Effects on Neural Activity

The one study reviewed shows that in birds, administration of bicuculline increases neural activity in females to a much greater degree than in males (Table 7.6.1.2).

Table 7.6.1.2. Bicuculline exposure, effects on neural activity.

Nature of Any Difference						Postpubertal
						Adult
More in males						
No signif. diff.						
More in females						**BIRD** *Zebra Finch*: J Wang et al. 1999 (in the robust nucleus of the archistriatum)

7.6.1.3. Bicuculline Exposure, Effects on Seizuring and Convulsing

Administration of bicuculline, a GABA$_A$ receptor blocker, can induce seizures. In rats, findings have been mixed regarding any sex differences in this regard, perhaps depending on age and various environmental factors (Table 7.6.1.3).

Table 7.6.1.3. Bicuculline exposure, effects on seizing and convulsing.

Nature of Any Difference					Postpubertal	
					Adolescent	Adult
Higher dosage required for males						**RODENT** *Rat*: Pericic & Bujas 1997* (seizuring induced by handling stress & after swim stress)
No signif. difference					**RODENT** *Rat*: Bujas et al. 1997* (seizuring in general)	**RODENT** *Rat*: Bujas et al. 1997* (seizuring in general); Chadda & Devaud 2004 (seizuring after housing stress)
Higher dosage required for females					**RODENT** *Rat*: Bujas et al. 1997* (higher dose threshold); Pericic & Bujas 1997* (hind limb extension convulsing after swim stress)	

7.6.2. Responses to Nevirapine

Nevirapine is used to treat patients with HIV. It helps to block additional infection of cells with the HIV virus. Findings of any sex differences in responses to this drug are shown below.

7.6.2.1. Rash Response to Nevirapine

One of the side-effects of taking nevirapine is the development of skin rashes. Two studies suggest that females who take nevirapine are more likely than males to develop these rashes (Table 7.6.2.1).

Table 7.6.2.1. Rash response to nevirapine.

Nature of Any Difference						Postpubertal
						Adult
Greater in males						
No signif. difference						
Greater in females						**ASIA** *China*: KH Wong et al. 2001 **NORTH AMERICA** *United States*: Bersoff-Matcha et al. 2001

7.6.3. Responses to Verapamil

Verapamil is a drug used primarily to treat angina pectoris (chest pain) and high blood pressure. The minimal findings of possible sex differences in responses to this drug appear below.

7.6.3.1. Verapamil Exposure, Therapeutic Response

According to one study, while there was no significant difference in the therapeutic response to verapamil among young adults, middle age and elderly adult females responded more quickly to Verapamil than did their male counterparts (Table 7.6.3.1).

Table 7.6.3.1. Verapamil exposure, therapeutic response.

Nature of Any Difference					Postpubertal
					Adult
Males faster					
No signif. difference					**NORTH AMERICA** *United States*: Schwartz et al. 1994* (young)
Females faster					**NORTH AMERICA** *United States*: Schwartz et al. 1994* (middle age & elderly)

7.7
RESPONSES TO STIMULANT DRUGS

Stimulant drugs are those that act upon the nervous system in ways that make the brain more alert to environmental stimulation. The stimulants that have received research attention regarding any possible sex differences are presented in alphabetical order.

7.7.1. Responses to Amphetamines

Amphetamines are a type of stimulant drug that was first chemically synthesized near the end of the 19th Century.

7.7.1.1. Amphetamine Exposure, Effects on Activity Levels

As a stimulant drug, amphetamine tends to result in increased activity under a variety of conditions. This effect is generally more evident in females than in males as is shown in Table 7.7.1.1.

Table 7.7.1.1. Amphetamine exposure, effects on activity levels.

Nature of Any Difference					Postpubertal	
					Adolescent	Adult
Males greater						**RODENT** *Rat*: EM Meyer & Lytle 1978
No signif. difference					**RODENT** *Rat*: R Diaz et al. 1995 (among prenatal corticosterone treated subjects)	
Females greater						**RODENT** *Rat*: Forgie & Stewart 1993 (to amphetamine challenge after 5 days of amphetamine pre-treatment); CH West & Michael 1988; Bisagno et al. 2003 (with acute or chronic treatment); Savageau & Beatty 1981 (1.0 mg/kg dose); WW Beatty & Holzer 1978 (1.5 mg/kg dose); TE Robinson et al. 1982 (locomotor activity); Stohr et al. 1998 (locomotor activity)

7.7.1.2. Amphetamine Exposure, Effects on Stereotypy

According to Table 7.7.1.2, most studies have found female rats to exhibit greater stereotypy after being repeatedly exposed to amphetamines than do male rats.

Table 7.7.1.2. Amphetamine exposure, effects on stereotypy.

Nature of Any Difference					Postpubertal
					Adult
More in males					
No signif. difference					**RODENT** *Rat*: WW Beatty and Holzer 1978* (5.0 mg/kg - after bilateral 6-OHDA lesions)
More in females					**RODENT** *Rat*: DM Camp & Robinson 1988 (stereotypy and sniffing after 10 days amphetamine treatment that yield equal CNS levels of amphetamine); Savageau & Beatty 1981 (5.0 mg/kg); WW Beatty & Holzer 1978* (5.0 mg/kg); WW Beatty et al. 1982 (5.0 mg/kg)

7.7.1.3. Amphetamine Exposure, Effects on Rotation Behavior

All of the available research among rats has concluded that females are more likely than males to exhibit rotational behavior following repeated amphetamine exposure (Table 7.7.1.3).

Table 7.7.1.3. Amphetamine exposure, effects on rotation behavior.

Nature of Any Difference					Postpubertal	
						Adult
More in males						
No signif. difference						
More in females						**RODENT** *Rat*: TE Robinson et al. 1980 (number of rotations during treatment); Storrie-Baker et al. 1992 (rotation scores); TE Robinson et al. 1982 (rotational response with amphetamine treatment followed by a second injection one week or 3-4 weeks later); J Becker et al. 1982 (CNS levels of amphetamine); Brass & Glick 1981 (1.0mg/kg)

7.7.1.4. Amphetamine Exposure, Sensitization Effects

Sensitization refers to an increase in a behavioral response when given the same dose of a drug repeatedly over days or weeks. Sex differences have been found in some behavioral paradigms but not in others and may be influenced by CNS injury. The pattern of most studies reported in Table 7.7.1.4 suggests that most of the sensitization effects of amphetamines on rats are greater in females than in males.

Table 7.7.1.4. Amphetamine exposure, sensitization effects.

Nature of Any Difference					Postpubertal	
						Adult
More in males						**RODENT** *Rat*: Melnick & Dow-Edwards 2001* (greater stereotypy sensitization with repeated treatment)
No signif. difference						**RODENT** *Rat*: Glick & Hinds 1984 (sensitization - rotational behavior); Melnick & Dow-Edwards 2001* (no locomotion sensitization with repeated treatment after neonatal cocaine exposure); Weiss et al. 2001 (in the effects of maternal separation or social isolation on a sensitization test for amphetamine)
More in females						**RODENT** *Rat*: Melnick & Dow-Edwards 2001* (locomotion sensitization with repeated treatment); TE Robinson 1984 (sensitization as measured by increases in rotational behavior with multiple treatments in rats with an unilateral 6-hydroxydopamine lesion of the substantia nigra); Melnick & Dow-Edwards 2001 (greater stereotypy sensitization with neonatal cocaine exposure)

7.7.2. Responses to Caffeine

Caffeine is a relatively mild stimulant contained in a number of plants, particularly in coffee beans. A few studies have compared males and females with respect to how they respond to caffeine.

7.7.2.1. Caffeine Exposure, Effects on Xanthine Oxidase Activity

Xanthine oxidase is a major source for free radicals, which gradually cause cellular damage in animals. One study found that consumption of caffeine caused a greater increase in xanthine oxidase among males than among females (Table 7.7.2.1).

Table 7.7.2.1. Caffeine exposure, effects on xanthine oxidase activity.

Nature of Any Difference					Postpubertal	
						Adult
More in males						**NORTH AMERICA** *United States*: Relling et al. 1992
No signif. difference						
More in females						

7.7.3. Responses to Cocaine

Cocaine is a potent stimulant drug whose use is illegal in most parts of the world. Its effects upon the brain appear to primarily involve the dopamine system.

7.7.3.1. Attempts to Procure Cocaine When Deprived

Once accustomed to receiving cocaine, most rats exhibit symptoms of addiction, including attempts to renew administration of the drug. As shown in Table 7.7.3.1, females are more likely than males to attempt to gain access to cocaine when the drug is no longer being administered.

Table 7.7.3.1. Attempts to procure cocaine when deprived.

Nature of Any Difference					Postpubertal	
						Adult
Greater in males						
No signif. difference						
Greater in females						**RODENT** *Rat*: WJ Lynch & Carroll 2000 (greater saline self injection after removal of cocaine); WJ Lynch et al. 2005 (greater lever responding during cocaine extinction trials)

7.7.3.2. Cocaine Discrimination Ability

When given access to both cocaine and saline solutions, two studies have reported that male and female rats are equally able to discriminate between these two substances (Table 7.7.3.2).

Table 7.7.3.2. Cocaine discrimination ability.

Nature of Any Difference					Postpubertal	
						Adult
Greater in males						
No signif. difference						**RODENT** *Rat*: KG Anderson & van Haaren 2000; RM Craft & Stratmann 1996
Greater in females						

7.7.3.3. Cocaine Exposure, Effects on Antinociception

While cocaine is not normally considered an anesthetic, it has been found to have some pain suppressive effects. One study of rats concluded that this effect was more pronounced in males than in females (Table 7.7.3.3).

Table 7.7.3.3. Cocaine exposure, effects on antinociception.

Nature of Any Difference					Postpubertal	
						Adult
Greater in males						**RODENT** *Rat*: RM Craft & Milholland 1998 (hot plate test)
No signif. difference						
Greater in females						

7.7.3.4. Cocaine Exposure, Effects on Behavior

According to one study, when rats were exposed to cocaine, females exhibited more oral-facial behavior than did males (Table 7.7.3.4).

Table 7.7.3.4. Cocaine exposure, effects on behavior.

Nature of Any Difference					Postpubertal	
						Adult
Males experience more						
No signif. difference						
Females experience more						**RODENT** *Rat*: Harrod et al. 2005 (oral-facial movements)

7.7.3.5. Cocaine Exposure, Effects on Conditioned Place Preference

According to one study, when cocaine is made available in a select location in a testing arena, female rats, more quickly than male rats, learn to prefer spending time in that location (Table 7.7.3.5).

Table 7.7.3.5. Cocaine exposure, effects on conditioned place preference.

Nature of Any Difference					Postpubertal	
						Adult
Greater in males						
No signif. difference						
Greater in females						**RODENT** *Rat*: SJ Russo et al. 2003

7.7.3.6. Cocaine Exposure, Effects on Corticosterone Plasma Levels

The three studies located on how cocaine affects corticosterone levels in plasma among rats all concluded that female levels rose significantly more than did those of males (Table 7.7.3.6).

Table 7.7.3.6. Cocaine exposure, effects on corticosterone plasma levels.

Nature of Any Difference				Postpubertal		
						Adult
Greater in males						
No signif. difference						
Greater in females						**RODENT** *Rat*: J Chin et al. 2001 (plasma levels after acute cocaine administration); S Russo et al. 2003:523 (plasma levels in response to cocaine treatment); S Russo et al. 2003:214 (plasma levels with cocaine exposure)

7.7.3.7. Cocaine Abuse, Effects on Health

Chronic exposure to cocaine, such as among persons addicted to the drug, has been shown by several studies to be associated with more ill health among females than among males (Table 7.7.3.7).

Table 7.7.3.7. Cocaine abuse, effects on health.

Nature of Any Differnce					Postpubertal	
						Adult
Greater adverse effects in males						
No signif. difference						
Greater adverse effects in females						**NORTH AMERICA** *United States*: ML Griffin et al. 1989; Kosten et al. 1993; Dudish & Hatsukami 1996 (among crack users); RD Weiss et al. 1997

7.7.3.8. Cocaine Exposure, Effects on Heart Rate

One study of persons who consume cocaine concluded that the heart rate of males increased more than that of females when consuming equal amounts of the drug (Table 7.7.3.8).

Table 7.7.3.8. Cocaine exposure, effects on heart rate.

Nature of Any Difference					Postpubertal	
						Adult
Greater increase in males						**NORTH AMERICA** *United States*: Sofuoglu et al. 1999
No signif. difference						
Greater increase in females						

7.7.3.9. Cocaine Exposure, Effects on Locomotive Behavior

According to most studies of rats, with either acute or chronic cocaine treatment, females are more likely than males to display an increase in locomotion. The opposite is found for mice (Table 7.7.3.9).

Table 7.7.3.9. Cocaine exposure, effects on locomotive behavior.

Nature of Any Difference					Postpubertal	
						Adult
Greater in males						**RODENT** *Mouse*: AC Morse et al. 1993 (exploratory activity after 2 days of cocaine treatment)
No signif. difference						**RODENT** *Rat*: Cailhol & Mormede 1999 (locomotive behavior by spontaneously hypertensive rats after acute treatment)
Greater in females						**RODENT** *Rat*: F van Haaren & Meyer 1991 (acute treatment, open field test; chronic treatment, home cage locomotion); RM Craft & Stratmann 1996 (locomotor behavior); Schindler & Carmona 2002 (locomotion); ED Festa et al. 2004 (locomotor activity)

7.7.3.10. Cocaine Exposure, Effects on Metabolism

The research on gender differences in the rate at which cocaine is metabolized by the body is limited to the study of human cocaine abusers. This research suggests that males metabolize cocaine more rapidly than do females (Table 7.7.3.10).

Table 7.7.3.10. Cocaine exposure, effects on metabolism.

Nature of Any Difference					Postpubertal	
						Adult
More rapid in males						**NORTH AMERICA** *United States*: Lukas et al. 1996 (cocaine abusers, blood levels after injection)
No signif. difference						
More rapid in females						

7.7.3.11. Cocaine Exposure, Effects on Plasma Levels

One study suggested that cocaine exposure resulted in higher plasma levels of the drug in male occasional users than in female occasional users (Table 7.7.3.11).

Table 7.7.3.11. Cocaine exposure, effects on plasma levels.

Nature of Any Difference					Postpubertal	
						Adult
Higher in males						**RODENT** *Rat:* SE Lukas et al. 1996 (among occasional users)
No signif. difference						
Higher in females						

7.7.3.12. Cocaine Exposure, Effects on Self-Administration

In general, female rodents are more likely to self-administer cocaine than are males. This is independent of the testing paradigm used (Table 7.7.3.12).

Table 7.7.3.12. Cocaine exposure, effects on self-administration.

Nature of Any Difference					Postpubertal	
						Adult
Greater in males						
No signif. difference						**RODENT** *Rat:* M Haney et al. 1995 (after social defeat in an aggressive encounter)
Greater in females						**RODENT** *Mouse*: AC Morse et al. 1993 (greater self administration C57Bl/6J and DBA.2J strains); *Rat*: WJ Lynch & Carroll 1999; ME Carroll et al. 2002 (high and low saccharin preferring rats); WJ Lynch et al. 2005; WJ Lynch et al. 2000 (estrus females); WJ Lynch & Taylor 2004 (on a progressive ratio schedule after forced abstinence)

7.7.3.13. Cocaine Exposure, Effects on Stereotypy

Stereotypy involves repeated sequences of the same movements such as repeated twitching or excessive lateral turning. In various experimental paradigms, cocaine has been shown to be more likely to stimulate stereotypic behavior in female than in male rodents (Table 7.7.3.13).

Table 7.7.3.13. Cocaine exposure, effects on stereotypy.

Nature of Any Difference					Postpubertal	
						Adult
Greater in males						
No signif. difference						
Greater in females						**RODENT** *Rat:* QD Walker et al. 2001; M Hu & Becker 2003 (repeated exposure in ovariectomized estrogen treated females with unilateral 6-OHDA lesions of the substantia nigra); Melnick & Dow-Edwards 2001; ED Festa et al. 2004 (acute treatment with various doses); J Chin et al. 2001 (after chronic pretreatment)

7.7.3.14. Cocaine Exposure, Effects on Subjective Feelings

Two studies of the subjective feelings about cocaine by cocaine users both concluded that males reported more changes in their subjective feelings than did females (Table 7.7.3.14).

Table 7.7.3.14. Cocaine exposure, effects on subjective feelings.

Nature of Any Difference					Postpubertal	
						Adult
Greater in males						**NORTH AMERICA** *United States*: SE Lukas et al. 1996 (self-detected feelings of 'high' faster); Sofuoglu et al. 1999 (paranoia)
No signif. difference						
Greater in females						

7.7.4. Responses to Methamphetamine

Methamphetamine is an especially addictive form of amphetamine and has become a fairly widely used drug of abuse in many Western countries in recent decades. Below are reviewed the studies of any sex differences in response to methamphetamine.

7.7.4.1. Methamphetamine Exposure, Effects on Conditioned Place Preference

Suggestive that female rats find the administration of methamphetamine more rewarding than do male rats, one study indicated that females spend more time in the location where they had received the drug in the past than did males (Table 7.7.4.1).

Table 7.7.4.1. Methamphetamine exposure, effects on conditioned place preference.

Nature of Any Difference					Postpubertal	
						Adult
Greater in males						
No signif. difference						
Greater in females						**RODENT** *Rat*: HH Chen et al. 2003

7.7.4.2. Methamphetamine Exposure, Effects on Locomotive Activity

One study concluded that administering methamphetamine to rats resulted in a greater increase in locomotor activity in females than in males (Table 7.7.4.2).

Table 7.7.4.2. Methamphetamine exposure, effects on locomotive activity.

Nature of Any Difference							Multiple Age Categories
Greater in males							
No signif. difference							
Greater in females							**RODENT** *Rat*: Schindler et al. 2002 (locomotor activity)

7.7.4.3. Methamphetamine Exposure, Effects on Metabolism

The one study that compared male and female rats in terms of the rate at which they metabolized methamphetamine found no significant gender difference (Table 7.7.4.3).

Table 7.7.4.3. Methamphetamine exposure, effects on metabolism.

Nature of Any Difference	Multiple Age Categories
Males faster	
No signif. difference	**RODENT** *Rat*: Yamada et al. 1986
Females faster	

7.7.4.4. Methamphetamine Exposure, Resistance to Neurotoxic Effects

Methamphetamine, a growing drug of abuse, appears to have toxic effects on various areas of the brain, particularly areas that are rich in dopamine. The available study has found females to be more resistant to these neurotoxic effects than males (Table 7.7.4.4).

Table 7.7.4.4. Methamphetamine exposure, resistance to neurotoxic effects.

Nature of Any Difference	Postpubertal
	Adult
Males more resistant	
No signif. difference	
Females more resistant	**RODENT** *Rat*: GC Wagner et al. 1993**;** Yu & Wagner 1994

7.7.4.5. Methamphetamine Exposure, Effects on Self-Administration

According to one study of rats, females are more likely to self-administer methamphetamine after a given period of deprivation than are males (Table 7.7.4.5). This supports the conclusion that females find the administration of methamphetamine more rewarding.

Table 7.7.4.5. Methamphetamine exposure, effects on self-administration.

Nature of Any Difference	Postpubertal
	Adult
Greater in males	
No signif. difference	
Greater in females	**RODENT** *Rat*: ME Roth & Carroll 2004

7.7.4.6. Methamphetamine Exposure, Effects on Dopamine and Its Metabolites

In several studies, methamphetamine exposure has been found to cause a depletion of dopamine, particularly in the striatum, an area of the brain that is a major target for dopaminergic neurons. Some studies have found this depletion to be greater in males than in females, while other studies report no significant difference (Table 7.7.4.6).

Table 7.7.4.6. Methamphetamine exposure, effects on dopamine and its metabolites.

Nature of Any Dif-ference					Postpubertal
					Adult
Greater depletion in males					**RODENT** *Mouse*: GC Wagner et al. 1993 (in the striatum 2 weeks post treatment); DB Miller et al. 1998 (in the striatum); YL Yu & Wagner 1994 (in the striatum 2 weeks post treatment); Dluzen et al., 2003 (dopamine levels in the striatum); Dluzen & McDermott 2004 (in BDNF deficient and overexpressing mice -greater nigrostriatal dopaminergic neurotoxicity); *Rat*: Heller et al. 2001 (pretreatment gestational days 7-18, acute challenge in adulthood, greater reduction in dopamine, homovanillic acid and dihyroxyphenylacetic acid in the striatum); CA Crawford et al. 2003* (treatment P11-20 greater decrease in striatal levels of DOPAC and PKA activity)
No signif. difference					**RODENT** *Rat*: Fukumura et al. 1998 (3 days post treatment, when animals are equated for methamphetamine induced hyperthermia); Gehrke et al. 2003 (in the striatum, nucleus accumbens, and prefrontal cortex 2 two weeks post treatment); CA Crawford et al. 2003* (treatment P11-20 in striatal levels of dopamine & D2-like receptors)
Greater depletion in females					

7.7.4.7. Methamphetamine Exposure, Effects on Serotonin

Administration of methamphetamine does not appear to lead to any sex differences in the activity/depletion of serotonergic markers in the brains of adult rats (Table 7.7.4.7).

Table 7.7.4.7. Methamphetamine exposure, effects on serotonin.

Nature of Any Difference					Postpubertal
					Adult
Greater in males					
No signif. difference					**RODENT** *Rat:* M Fukumura et al. 1998 (equal decreases in striatal serotonin 3 days post treatment, when animals are equated for methamphetamine induced hyperthermia); Gehrke et al. 2003 (no difference in striatum, nucleus accumbens, and prefrontal cortex depletions of serotonin, and 5-HIAA two weeks post treatment)
Greater in females					

7.7.5. Responses to Nicotine

Nicotine is a stimulant drug that often gives users a relaxed feeling of euphoria, and has been shown to be highly addictive for many users. It is most often administered by smoking tobacco cigarettes.

7.7.5.1. Nicotine Exposure, Effects on Adrenocorticotropin

Perhaps depending on age and dosage of administration, nicotine has been shown to increase adrenocorticotropin levels more in female rats than in male rats (Table 7.7.5.1).

Table 7.7.5.1. Nicotine exposure, effects on adrenocorticotropin.

Nature of Any Dif-ference				Postpubertal	
				Adolescent	Adult
Greater in males					
No signif. difference				**RODENT** *Rat*: LC Klein 2001* (exposed to 12mg/kg nicotine or saline for 19 days as juveniles)	
Greater in females				**RODENT** *Rat*: LC Klein 2001* (exposed to 6mg/kg nicotine for 19 days as juveniles)	**RODENT** *Rat*: ME Rhodes et al. 2001:681 (acute nicotine treatment)

7.7.5.2. Nicotine Exposure, Effects on Locomotor Activity

Among rats, females have been shown to exhibit greater locomotor activity than males in response to being administered nicotine (Table 7.7.5.2).

Table 7.7.5.2. Nicotine exposure, effects on locomotor activity.

Nature of Any Difference					Postpubertal
					Adult
Greater in males					
No signif. difference					
Greater in females					**RODENT** *Rat*: Rosecrans 1971 (young); Battig 1981; Booze et al. 1999; Kanyt et al. 1999:182

7.7.5.3. Nicotine Exposure, Effects on Corticosterone

According to two studies, plasma levels of corticosterone have been shown in rats to be higher in females than in males, although one study failed to find any significant sex difference in corticosterone release after administering nicotine in rats (Table 7.7.5.3).

Table 7.7.5.3. Nicotine exposure, effects on corticosterone.

Nature of Any Difference					Postpubertal	
						Adult
Greater in males						
No signif. difference						**RODENT** *Rat*: Grota et al. 1997 (release in response to nicotine)
Greater in females						**RODENT** *Rat*: L Klein 2001 (greater plasma levels when exposed to nicotine for 19 days as juveniles); ME Rhodes et al. 2001 (greater plasma levels in response to acute nicotine)

7.7.5.4. LDL Cholesterol Response to Nicotine and/or Cigarette Smoking

Two studies of the effects of nicotine on cholesterol have concluded that nicotine elevates LDL (bad) cholesterol more in female smokers than in males smokers (Table 7.7.5.4).

Table 7.7.5.4. LDL cholesterol response to nicotine and/or cigarette smoking.

Nature of Any Difference					Postpubertal	
						Adult
More among males						
No signif. difference						
More among females						**EUROPE** *Germany*: Cullen et al. 1998; *Italy*: Bolego et al. 2002

7.7.5.5. Depression Alleviating Response to Nicotine and/or Cigarette Smoking

At least for persons who are regular smokers, nicotine seems to elevate mood. A few studies have sought to determine if this effect is greater for one sex than for the other, all of which have concluded that the effect is stronger in males than females (Table 7.7.5.5).

Table 7.7.5.5. Depression alleviating response to nicotine and/or cigarette smoking.

Nature of Any Difference					Postpubertal	
						Adult
More in males						**EUROPE** *Britain*: Pomerleau et al. 1991 **NORTH AMERICA** *United States*: T Frederick et al. 1988; Anda et al. 1990; LJ Solomon & Flynn 1993
No signif. difference						
More in females						

7.7.5.6. Nicotine Exposure, Effects on Metabolism

The rate at which nicotine is metabolized can be measured in various ways, including the speed with which it reaches the blood or the brain. As shown in Table 7.7.5.6, research findings have not been consistent regarding which sex metabolizes nicotine most rapidly, with results varying between and possibly within species. Some of the inconsistencies may have to do with how nicotine is being administered, such as whether it is derived through smoking, ingesting, or injecting.

Table 7.7.5.6. Nicotine exposure, effects on metabolism.

Nature of Any Difference					Postpubertal		Multiple Age Categories
						Adult	
Males metabolize faster							**NORTH AMERICA** *United States*: Beckett et al. 1971 (non-smokers); Benowitz & Jacobs 1984 (smokers) **PRIMATE (EXCEPT APE)** *Macaque*: Seaton et al. 1991 **RODENT** *Rat*: Kyerematen et al. 1988
No signif. difference							**RODENT** *Mouse*: Stalhandski et al. 1969 (mixed findings)
Females metabolize faster						**RODENT** *Rat*: Rosecrans 1972 (reaching the brain, young); Rosecrans & Schechter 1972 (nicotine levels in brain)	**NORTH AMERICA** *United States*: Zeman et al. 2002 (female smokers maintained lower nicotine levels in the blood, but smoked the same number of cigarettes)

7.7.5.7. Nicotine Exposure, Effects on Learning

The one study of active avoidance learning in rats concluded that males improved more than did females when exposed to moderate levels of nicotine (Table 7.7.5.7).

Table 7.7.5.7. Nicotine exposure, effects on learning.

Nature of Any Difference					Postpubertal
Males improved more					**RODENT** *Rat*: Yilmaz et al. 1997 (young, active avoidance learning)
No signif. difference					
Females improved more					

7.7.5.8. Nicotine Exposure, Relaxation/Calming Effects

A few researchers have asked human subjects who are (or have been) regular smokers to rate the degree to which smoking helps them to feel relaxed or calm. Most of these studies have revealed no significant sex difference in average ratings (Table 7.7.5.8).

Table 7.7.5.8. Nicotine exposure, relaxation/calming effects.

Nature of Any Difference					Postpubertal
More in males					
No signif. difference					**NORTH AMERICA** *United States*: KA Perkins et al. 1993; KA Perkins et al. 1994; Pomerleau et al. 1994
More in females					**NORTH AMERICA** *United States*: File et al. 2001

7.7.5.9. Nicotine Exposure, Effects on Weight (Suppression)

Table 7.7.5.9 indicates that nicotine consumption helps females to lose weight (or stop gaining weight) to a greater degree than it does in males.

Table 7.7.5.9. Nicotine exposure, effects on weight (suppression).

Nature of Any Difference					Postpubertal
					Adult
Greater in males					
No signif. difference					
Greater in females					**NORTH AMERICA** *United States*: DF Williamson et al. 1991 (smoking cigarettes); SA French et al. 1994; K Dohertyet al. 1996 (nicotine gum) **RODENT** *Rat*: Grunberg et al. 1986

7.7.5.10. Nicotine Exposure, Effects on Activity

According to multiple studies, nicotine tends to increase activity levels more for females than it does for males (Table 7.7.5.10).

Table 7.7.5.10. Nicotine exposure, effects on activity.

Nature of Any Difference					Postpubertal
					Adult
Greater increase in males					
No signif. difference					
Greater increase in females					**RODENTS** *Rat*: Rosecrans & Scheter 1972; Battig 1981; Kanyt et al. 1999; Harrod et al. 2004:585

7.8
RESPONSES TO HALLUCINOGENIC AND PSYCHEDELIC DRUGS

All of the drugs reviewed below have hallucinogenic or psychadelic effects in humans, at least with high dosages. Sex differences in responses to these drugs vary considerably.

7.8.1. Responses to CP55,940

CP55,940 is a synthetic cannabinoid mainly used in experiments with laboratory animals. Findings of sex differences in responses to this drug are presented below.

7.8.1.1. CP55,940 Exposure, Effects on Locomotion

According to the one study cited in Table 7.8.1.1, administration of CP55,940 to adult rats resulted in a greater increase in locomotion in females than males.

Table 7.8.1.1. CP55,940 exposure, effects on locomotion.

Nature of Any Difference					Postpubertal	
More in males						
No signif. difference						
More in females						**RODENT** *Rat*: AH Tseng & Craft 2001

7.8.1.2. CP55,940 Exposure, Effects on Catalepsy

The one study that was located on how CP55,940 might impact the sexes differently with regard to basic posture concluded that females exhibited catalepsy (an unusually awkward posture) to a greater degree than did males administered the same drug (Table 7.8.1.2).

Table 7.8.1.2. CP55,940 exposure, effects on catalepsy.

Nature of Any Difference					Postpubertal	
More in males						
No signif. difference						
More in females						**RODENT** *Rat*: AH Tseng & Craft 2001

7.8.2. Responses to Delta 9-Tetrahydrocannabinol

Delta 9-THC is the primary active ingredient in marijuana. Sex differences in responses to this ingredient have been investigated and are summarized in the following subsection.

7.8.2.1. Delta 9-Tetrahydrocannabinol Exposure, Effects on Locomotion

Administration of delta 9-THC to both adult rats and mice appears to cause a greater increase in locomotion by females than by males (Table 7.8.2.1).

Table 7.8.2.1. Delta 9-tetrahydrocannabinol exposure, effects on locomotion.

Nature of Any Difference					Postpubertal	
						Adult
Greater increase in males						
No signif. difference						
Greater increase in females						**RODENT** *Rat*: Tseng & Craft 2001; *Mouse*: Wiley 2003 (acute & 3 days of treatment)

7.8.2.2. Delta 9-Tetrahydrocannabinol Exposure, Effects on Catalepsy

When adult rats are administered delta 9-THC, females appear to exhibit catalepsy (extremely awkward postures) to a greater degree than males (Table 7.8.2.2).

Table 7.8.2.2. Delta 9-tetrahydrocannabinol exposure, effects on catalepsy.

Nature of Any Difference					Postpubertal	
						Adult
More in males						
No signif. difference						
More in females						**RODENT** *Rat*: Tseng & Craft 2001; Tseng & Craft 2004

7.8.2.3. Delta 9-THC Exposure, Effects on Pain Tolerance

Exposure to delta 9-THC in adult rats appears to increase pain tolerance more in females than in males (Table 7.8.2.3).

Table 7.8.2.3. Delta 9-THC exposure, effects on pain tolerance.

Nature of Any Difference					Postpubertal	
						Adult
More in males						
No signif. difference						
More in females						**RODENT** *Rat*: Tseng & Craft 2001 (tail withdrawal task); AH Tseng & Craft 2004 (tail flick task)

7.8.2.4. Delta 9-THC Exposure, Brain Levels

According to one study, females have higher levels of delta 9-THC in brain tissue following exposure (Table 7.8.2.4).

Table 7.8.2.4. Delta 9-THC exposure, brain levels.

Nature of Any Difference					Postpubertal	
						Adult
More in males						
No signif. difference						
More in females						**RODENT** *Rat*: Tseng et al. 2004* (11-hydroxy-delta 9-THC, the major active metabolite of delta 9-THC, in the brain)

7.8.3. Responses to 11-Hydroxy-Delta 9-Tetrahydrocannabinol

11-hydroxy-delta 9-tetrahydrocannabinol (11-hydroxy-delta 9-THC) is an active metabolite of delta 9-THC. Sex differences in responses to this metabolite have been reported in a few studies as reviewed below.

7.8.3.1. 11-Hydroxy-Delta 9-THC Exposure, Effects on Antinociception

One study concluded that in adult rats, administration of 11-hydroxy-delta 9-THC leads to a greater analgesic response to pain in females relative to males (Table 7.8.3.1).

Table 7.8.3.1. 11-hydroxy-delta 9-THC exposure, effect on antinociception.

Nature of Any Difference					Postpubertal	
						Adult
Greater in males						
No signif. difference						
Greater in females						**RODENT** *Rat*: Tseng & Craft 2001 (tail withdrawal task)

7.8.3.2. 11-Hydroxy-Delta 9-THC Exposure, Effects on Locomotion

According to one study of rats, administration of 11-hydroxy-delta 9-THC leads to more locomotion by females than by males (Table 7.8.3.2).

Table 7.8.3.2. 11-hydroxy-delta 9-THC exposure, effects on locomotion.

Nature of Any Difference					Postpubertal	
						Adult
Greater in males						
No signif. difference						
Greater in females						**RODENT** *Rat*: Tseng & Craft 2001

7.8.3.3. 11-Hydroxy-Delta 9-THC Exposure, Brain Levels After

According to one study, at least one part of the body – the brain – has higher 11-hydroxy-delta 9-THC levels in female rats than in male rats after exposure (Table 7.8.3.3).

Table 7.8.3.3. 11-hydroxy-delta 9-THC exposure, brain levels after.

Nature of Any Difference					Postpubertal	
						Adult
More in males						
No signif. difference						
More in females						**RODENT** *Rat*: Tseng et al. 2004*

7.8.4. Responses to Lysergic Acid Diethylamide

Lysergic acid diethylamide (LSD) is a psychedelic drug that often induces hallucinations in humans and seems to primarily affect the function of the serotonergic system. Below, research on sex differences in the effects of LSD is reviewed.

7.8.4.1. Lysergic Acid Diethylamide Exposure, Rewarding Effects of

The one study reviewed addressing whether sex differences existed in the apparent rewarding effects of LSD was conducted among rats. It found males revisiting the location where they had been administered LSD more often than did females (Table 7.8.4.1).

Table 7.8.4.1. Lysergic acid diethylamide exposure, rewarding effects of.

Nature of Any Difference					Postpubertal	
						Adult
Greater in males						**RODENT** *Rat*: Meehan & Schechter 1998 (place preference for location where LSD was administered)
No signif. difference						
Greater in females						

7.9

RESPONSES TO TRICYCLIC ANTIDEPRESSANTS

As their name implies, antidepressants are therapeutic drugs that are used to treat depression that is severe and prolonged enough to come to clinical attention. Named for their three-ring chemical structure, tyicyclic forms of antidepressants have been prescribed since the 1950s. Studies of sex differences in responses to this category of drugs are presented below.

7.9.1. Responses to Tricyclics in General

Tricyclic medications are a class of drugs that have been used since the 1950s for treatment of unipolar depression. Sex differences in responses to tricyclics appear below.

7.9.1.1. Tricyclics Exposure in General, Therapeutic Response

As shown in Table 7.9.1.1, most studies have concluded that among depressed patients, males benefit more than females do from treatment with a class of drugs known as tricyclics.

Table 7.9.1.1. Tricyclics exposure in general, therapeutic response.

Nature of Any Difference				
			Postpubertal	
				Adult
Male depressed patients benefit more				**NORTH AMERICA** *United States*: Raskin 1974; Glassman et al. 1977; J Davidson & Pelton 1986; Kornstein et al. 2000a
No signif. difference				**NORTH AMERICA** *United States*: Quitkin et al. 2002
Female depressed patients benefit more				

7.9.2. Responses to Amitriptyline

As a tricyclic, amitriptyline is used primarily to treat depression, although it is sometimes also used to alleviate pain and migraine headaches. Studies of sex differences in responses to amitriptyline are reviewed below.

7.9.2.1. Amitriptyline Exposure, Effects on Immobility

Table 7.9.2.1 shows that one study using mice found that there was no significant gender difference in immobility caused by the consumption of amitriptyline.

Table 7.9.2.1. Amitriptyline exposure, effects on immobility.

Nature of Any Difference						
					Postpubertal	
						Adult
Greater in males						
No signif. difference						**RODENT** *Mouse*: Caldarone et al. 2003 (immobility time in a tail suspension test)
Greater in females						

7.9.2.2. Amitriptyline Exposure, Effects on Learned Helplessness

According to one study of mice, females seems to decrease their tendency toward learned helplessness to a greater degree than males when administered amitriptyline (Table 7.9.2.2).

Table 7.9.2.2. Amitriptyline exposure, effects on learned helplessness.

Nature of Any Difference						
					Postpubertal	
						Adult
Greater in males						
No signif. difference						
Greater in females						**RODENT** *Mouse*: Caldarone et al. 2003 (decrease in escape latency in a learned helplessness test)

7.9.2.3. Amitriptyline Exposure, Effects on Forced Swim Test

A study using mice suggested that there were no significant sex differences in time spent swimming when animals were forced to do so when under the influence of amitriptyline (Table 7.9.2.3).

Table 7.9.2.3. Amitriptyline exposure, effects on forced swim test.

Nature of Any Difference						
					Postpubertal	
						Adult
Greater in males						
No signif. difference						**RODENT** *Mouse*: Caldarone et al. 2003 (decrease in swim time in forced swim task)
Greater in females						

7.9.3. Responses to Clomipramine

Clomipramine is a tricyclic drug used to treat depression and obsessive-compulsive symptoms. Male-female differences in responses to this drug are summarized in this subsection.

7.9.3.1. Clomipramine Exposure, Effects on the Circadian Rhythm

The tricyclic antidepressant clomipramine (Anafranil) was investigated in one study concerning its effects on the circadian rhythm in rats. As shown in Table 7.9.3.1, this study concluded that the effects were greater in females than in males.

Table 7.9.3.1. Clomipramine exposure, effects on the circadian rhythm.

Nature of Any Difference					Postpubertal	
						Adult
Increased more in males						
No signif. difference						
Increased more in females						**RODENT** *Rat*: Dwyer & Rosenwasser 1998 (circadian amplitude after neonatal treatment)

7.9.3.2. Clomipramine Exposure, Effects on Alcohol Intake

One study of clomipramine indicated that there was no significant sex difference in the extent to which this drug increased alcohol intake (Table 7.9.3.2).

Table 7.9.3.2. Clomipramine exposure, effects on alcohol intake.

Nature of Any Difference					Postpubertal	
						Adult
Greater in males						
No signif. difference						**RODENT** *Rat*: Dwyer & Rosenwasser 1998 (alcohol intake after neonatal treatment)
Greater in females						

7.9.4. Responses to Desipramine

Desipramine (Norpramin) is a tricyclic antidepressant that appears to operate by inhibiting neuronal re-uptake of norepinephrine. It is also sometimes used to treat enuresis. Findings pertaining to any sex differences in the effects of desipramine are presented below.

7.9.4.1. Desipramine Exposure, Effects on Adrenocorticotropin Hormone

According to one study, cited in Table 7.9.4.1, when desipramine was administered to rats, it resulted in a greater increase in the production of, and subsequent blood plasma levels of, adrenocorticotropin in females than in males.

Table 7.9.4.1. Desipramine exposure, effects on adrenocorticotropin hormone.

Nature of Any Difference					Postpubertal	
						Adult
Greater in males						
No signif. difference						
Greater in females						**RODENT** *Rat*: C Kuhn & Francis 1997 (production and plasma levels)

7.9.4.2. Desipramine Exposure, Effects on Dopamine Receptors

According to one study of rats, this drug had somewhat conflicting effects on striatal dopamine receptor numbers, depending on the specific dopamine receptors involved (Table 7.9.4.2).

Table 7.9.4.2. Desipramine exposure, effects on dopamine receptors.

Nature of Any Difference				Postpubertal	
				Adolescent	
Greater in males				**RODENT** *Rat*: Hilakivi et al. 1999* (P6-22 treatment at P34 lower D1/D2 ratio of maximum receptor numbers - dorsal striatum)	
No signif. difference					
Greater in females				**RODENT** *Rat*: Hilakivi et al. 1999* (P6-22 treatment at P34 decrease in D2 receptors -dorsal striatum)	

7.9.5. Responses to Imipramine

Imipramine is a tricyclic antidepressant used to treat depression and enuresis. Studies of sex differences in the effects of imipramine are summarized below.

7.9.5.1. Imipramine, Therapeutic Effect

Table 7.9.5.1 indicates that the tricyclic antidepressant imipramine is more likely to relieve depression among male patients than among female patients. A review by JA Hamilton et al. (1996) reached this same conclusion.

Table 7.9.5.1. Imipramine, therapeutic effect.

Nature of Any Difference					Postpubertal
					Adult
Male depressed patients benefit more					**EUROPE** *Britain*: Medical Research Council 1965 **NORTH AMERICA** *United States*: Flemminger & Groden 1962; IC Wilson et al. 1966; Raskin 1974; Kornstein et al. 2000a; Kornstein et al. 2000b
No signif. difference					
Females depressed patients benefit more					

7.10

RESPONSES TO ANTIDEPRESSANTS OTHER THAN TRICYCLICS

Sex differences may exist in the effects of non-tricyclic drugs primarily used to treat depression. These drugs include the monoamine oxidase inhibitors and the selective serotonergic reuptake inhibitors. Findings related to these substances are presented in the tables below.

7.10.1. Responses to Monoamine Oxidase Inhibitors

Monoamine oxidase (MAO) is an enzyme found throughout the body. In the brain, it is primarily involved with the breakdown of the amine neurotransmitters once they are released into the synaptic cleft. People vary a great deal with respect to the activity of MAO in the brain. Drugs known as monoamine oxidase inhibitors (MAO-Is) have been developed to diminish this activity, and they have been found to be helpful in treating depression among some sufferers. Research findings on male-female differences in responses to MAO-Is are presented below.

7.10.1.1. MAO-I Exposure in General, Therapeutic Response

Monoamine oxidase (MAO) inhibitors are a class of drugs primarily used for treating unipolar depression. Studies have indicated that female depressed patients are more likely than their male counterparts to benefit from these medications (Table 7.10.1.1).

Table 7.10.1.1. MAO-I exposure in general, therapeutic response.

Nature of Any Difference				Postpubertal
				Adult
More favorable in males				
No signif. difference				
More favorable in females				**EUROPE** *Britain*: Clinical Psychiatry Committee 1965 **NORTH AMERICA** *United States*: J Davidson & Pelton 1986; Kornstein et al. 2000

7.10.1.2. Pargyline Exposure, Effects on Body Temperature

Pargyline is a monoamine oxidase inhibiting drug used in the treatment of certain types of depression. As shown in Table 7.10.1.2, one study of rats indicated that females experienced a greater reduction in body temperature than did males as a result of being injected with this drug.

Table 7.10.1.2. Pargyline exposure, effects on body temperature.

Nature of Any Difference	Postpubertal
	Adult
Greater in males	
No signif. difference	
Greater in females	**RODENT** *Rat*: MK Carlsson et al. 1985 (temperature decrease)

7.10.1.3. Pargyline Exposure, Effects on Serotonin

Pargyline appears to contribute to a reduction in depressive symptoms for some patients, at least in part, by increasing serotonin levels. One study of rats suggested that pargyline increased the whole brain levels/accumulation of serotonin more in females than in males (Table 7.10.1.3).

Table 7.10.1.3. Pargyline exposure, effects on serotonin.

Nature of Any Difference	Postpubertal
	Adult
Greater in males	
No signif. difference	
Greater in females	**RODENT** *Rat*: Carlsson et al. 1985 (whole brain accumulations with & without co-treatment with l-tryptophan)

7.10.2. Responses to Selective Serotinergic Reuptake Inhibitors

Some antidepressants appear to have their therapeutic effect by preventing serotonin from being broken down and reabsorbed by axon terminals from which they were emitted, thereby allowing serotonin to remain longer in the synaptic cleft and potentially bind to and affect the functioning of the post-synaptic neuron. These drugs are known as selective serotonergic reuptake inhibitors (or SSRIs). Findings concerning any sex differences in responses to SSRIs are presented below.

7.10.2.1. Fluoxetine Exposure, Effects on Adrenocorticotropin

Fluoxetine (Prozac), a drug primarily used in the treatment of depression, was administered to rats to assess some of its biochemical effects. According to one study using rats, the release of adrenocorticotropin was greater in females than in males following the consumption of fluoxetine. Blood plasma levels of adrenocorticotropin were also elevated by fluoxetine (Table 7.10.2.1).

Table 7.10.2.1. Fluoxetine exposure, effects on adrenocorticotropin.

Nature of Any Difference	Postpubertal
	Adult
Greater in males	
No signif. difference	
Greater in females	**RODENT** *Rat*: C Kuhn & Francis 1997 (release & plasma levels)

7.10.2.2. Fluoxetine Exposure, Therapeutic Response

According to one study, there is no significant sex difference in the extent to which fluoxetine alleviates unipolar depression among depressed patients (Table 7.10.2.2).

Table 7.10.2.2. Fluoxetine exposure, therapeutic response.

Nature of Any Difference			Postpubertal	
				Adult
Male depressed patients benefit more				
No signif. difference				**NORTH AMERICA** *United States*: Quitkin et al. 2002
Female depressed patients benefit more				

7.10.2.3. Sertaline, Satisfaction Effects

Sertaline (Zoloft) is a selective serotonergic reuptake inhibitor (SSRI) that is primarily used to treat depression. One study compared men and women with clinical depression in terms of their degree of satisfaction with sertaline. As shown in Table 7.10.2.3, female patients were more satisfied than males according to two measures of satisfaction.

Table 7.10.2.3. Sertaline, satisfaction effects.

Nature of Any Difference					Postpubertal	
						Adult
Greater in males						
No signif. difference						
Greater in females						**NORTH AMERICA** *United States:* Kornstein et al. 2000 (asked to continue taking the medication, more favorable evaluation relative to imipramine)

7.11

RESPONSES TO ANTIPSYCHOTICS

Antipsychotic medications are primarily those used to treat schizophrenia and other delusional disorders.

7.11.1. Responses to Haloperidol

Haloperidol is an antipsychotic that operates as a dopamine antagonist. It is often used to help treat symptoms of schizophrenia. Findings from studies of sex differences in the effects of haloperidol are presented below.

7.11.1.1. Haloperidol Exposure, Effects on Posture During Catalepsy

One of the symptoms of schizophrenia is catalepsy, a tendency to maintain an immobile position or posture for an unusually long period of time. A study of rats found that males given haloperidol maintained cataleptic postures differently than did females (Table 7.11.1.1).

Table 7.11.1.1. Haloperidol exposure, effects on posture during catalepsy.

Nature of Any Difference					Postpubertal	
						Adult
Greater in males						**RODENT** *Rat*: EF Field et al. 2000 (maintain posture on an inclined plane at a higher angle during catalepsy)
No signif. difference						
Greater in females						

7.11.1.2. Haloperidol Exposure, Effects on Body Temperature

According to one study, female rats given haloperidol exhibited a greater drop in body temperature than male rats given the same drug (Table 7.11.1.2).

Table 7.11.1.2. Haloperidol exposure, effects on body temperature.

Nature of Any Difference					Postpubertal	
						Adult
Greater reduction in males						
No signif. difference						
Greater reduction in females						**RODENT** *Rat*: de-la-Cruz et al. 1987 (hypothermia)

7.12

RESPONSES TO NEUROTOXINS AND ANTI-NERVE GROWTH FACTORS

Neurotoxins and anti-nerve growth factors (anti-NGFs) are chemicals that interfere with the normal development and/or functioning of the brain and spinal cord. They induce these disturbances in a wide variety of ways, some of which are obvious while others are exceedingly subtle.

7.12.1. Responses to Neurotoxins

Chemicals that fundamentally alter the normal the development and/or functioning of the brain and spinal cord are known as neurotoxins. A few studies have sought to determine if any sex differences exist in the effects of neurotoxins; findings are summarized below.

7.12.1.1. Formalin Exposure, Effects on Adrenocorticotropin Hormone

Formalin is weak formaldehyde mixture and is classified as a neurotoxin. According to one study, it has greater effects on increasing adrenocoticotropin hormone levels in the plasma of females than males, at least among rats (Table 7.12.1.1).

Table 7.12.1.1. Formalin exposure, effects on arenocorticotropin hormone.

Nature of Any Difference					Postpubertal	
						Adult
Greater in males						
No signif. difference						
Greater in females						**RODENT** *Rat*: Aloisi et al. 1996 (injection in the hindpaw)

7.12.1.2. Methylazoxymethanol Acetate Exposure, Effects on Cerebellum

Exposure to methylazoxymethanol acetate was shown to reduce the weight of the cerebellum of rats to an equal degree in males and females (Table 7.12.1.2).

Table 7.12.1.2. Methylazoxymethanol acetate exposure, effects on cerebellum.

Nature of Any Difference					Postpubertal	
						Adult
More in males						
No signif. difference						**RODENT** *Rat*: SA Ferguson et al. 1996 (cerebellar weight as compared to controls)
More in females						

7.12.1.3. Methylazoxymethanol Acetate Exposure, Effects on Locomotion

The one study of the effects of methylazoxymethanol acetate exposure early in life on locomotor behavior in adulthood was conducted using rats. It was found that exposure to this neurotoxic drug increased locomotor activity to a statistically equivalent degree in males and females (Table 7.12.1.3).

Table 7.12.1.3. Methylazoxymethanol acetate exposure, effects on locomotion.

Nature of Any Difference						Postpubertal
						Adult
More in males						
No signif. difference						**RODENT** *Rat*: SA Ferguson et al. 1996 (locomotor increasing effects of methamphetamine after treatment P5-8)
More in females						

7.12.1.4. 1-Methyl-4-Phenyl-1,2,3,6-Tetrahydropyridine Exposure, Effects on Dopamine Levels

Treatment with the neurotoxin 1-methyl-4-phenyl-1,2,3,6-tetrahydropyridine (MPTP) has been shown to cause greater dopamine depletion in the striatum of male than female mice (Table 7.12.1.4).

Table 7.12.1.4. 1-methyl-4-phenyl-1,2,3,6-tetrahydropyridine exposure, effects on dopamine levels.

Nature of Any Difference						Postpubertal
						Adult
More in males						**RODENT** *Mouse*: Freyaldenhoven et al. 1996 (in the striatum); DB Miller et al. 1998 (in the striatum)
No signif. difference						
More in females						

7.12.1.5. Picrotoxin Exposure, Effect on Corticosterone

According to one study, the neurotoxin picrotoxin causes plasma corticosterone levels of female rats to rise more than that of males when administered the same dose (Table 7.12.1.5).

Table 7.12.1.5. Picrotoxin exposure, effects on corticosterone.

Nature of Any Difference						Postpubertal
						Adult
Greater in males						
No signif. difference						
Greater in females						**RODENT** *Rat*: Pericic et al. 1985 (plasma)

7.12.1.6. Picrotoxin Exposure, Effects on Seizures

Studies have reached seemingly inconsistent conclusions about the extent to which males and females exhibit seizures following exposure to picrotoxin (Table 7.12.1.6).

Table 7.12.1.6. Picrotoxin exposure, effects on seizure.

Nature of Any Difference	Prepubertal					Postpubertal
	Infant					Adult
More in males						**RODENT** *Mouse*: Pericic et al. 1986*; *Rat*: M Tan & Tan 2001* (testosterone pre-treatment)
No signif. difference	**RODENT** *Rat*: D Pericic et al. 1996* (P20 treatment, convulsion)					**RODENT** *Rat*: M Tan & Tan 2001* (mean latency to seizure)
More in females						**FELINE** *Cat*: Pericic et al 1986* **RODENT** *Rat*: Pericic et al. 1985*; Pericic et al. 1996*; Pericic et al. 1986*

7.12.2. Responses to Anti-Nerve Growth Factors

The bodies of nearly all animals contain genetically regulated naturally occurring protein molecules that stimulate the growth and differentiation of nerve cells called nerve growth factors (or NGFs). Substances (usually artificially created) that interfere with the functioning of NGFs are known as anti-nerve growth factors (or anti-NGFs). Research findings having to do with sex differences in how organisms respond to exposure to anti-NGFs are presented below.

7.12.2.1. Anti-NGFs Exposure, Effects on Choline Acetyltransferase Activity

The one study reviewed on the effects of anti-NGFs shows that in rats administration of anti-NGF at about two weeks post-birth lead to a bigger change in cholinergic activity in the cortex of females than males. However, sex differences with this treatment were not found in the hippocampus or striatum (Table 7.12.2.1).

Table 7.12.2.1. Anti-NGFs exposure, effects on choline acetyltransferase activity.

Nature of Any Difference	Prepubertal
	Infant
More in males	
No signif. difference	**RODENT** *Rat*: Ricceri et al. 1997* (P2-12 treatment, in the hippocampus & striatum at P16)
More in females	**RODENT** *Rat*: Ricceri et al. 1997* (P2-12 treatment, in the cortex at P16)

7.13

DRUGS AFFECTING THE STRESS RESPONSE SYSTEM

A variety of physiological changes occur as a result of stressful experiences, most of which are triggered by the secretion of various so-called stress hormones such as cortisol, corticosterone, and adrenaline. Certain drugs have been found to have substantial effects on the overall stress response, two of which are hydrocortisone and ketoconazole, both of which are discussed in the following brief section.

7.13.1. Responses to Hydrocortisone

Hydrocortisone is a manufactured drug that is chemically similar to certain stress hormones, particularly cortisol. It is sometimes used to help boost the functioning of the body's immune system. A possible sex difference in responses to hydrocortisone is presented in the following table.

7.13.1.1. Hydrocortisone Exposure, Effects on Neural Growth

According to one study, in adult rats, treatment with hydrocortisone increased neural growth following brain damage in females, but actually decreased such growth in males (Table 7.13.1.1).

Table 7.13.1.1. Hydrocortisone exposure, effects on neural growth.

Nature of Any Difference	Postpubertal
	Adult
More in males	
No signif. difference	
More in females	**RODENT** *Rat:* Scheff et al. 1988 (after entorhinal cortex removal, increased outgrowth of commissural-associational afferent fibers of the hippocampus; males exhibit decreased growth)

7.13.2. Responses to Ketoconazole

Ketoconazole is a stress-impacting drug with many experimental uses but is rarely the drug of choice for specific human ailments. Sex differences in its effect are explored in the following table.

7.13.2.1. Ketoconazole Exposure, Effects on Heroin Self-Administration

Under food restriction, adult rats will increase their frequency of self-administration of heroin. The one study of how ketoconazole affects this change in behavior concluded that it suppressed heroin self-administration more in females than in males (Table 7.13.2.1).

Table 7.13.2.1. Ketoconazole exposure, effects on heroin self-administration.

Nature of Any Difference					Postpubertal	
						Adult
Suppressed more in males						
No signif. difference						
Suppressed more in females						**RODENT** *Rat:* Carroll et al. 2001 (after food restriction)

7.14
RESPONSES TO NON-DRUG THERAPIES FOR PHYSICAL ILLNESSES

Sex differences in responses to therapies for physical illnesses of a largely non-drug nature are presented in the present section.

7.14.1. Responses to Heart Surgery in General

Various types of heart surgery are widely performed throughout the world. Studies of how males or females may respond differently to such surgery are summarized below.

7.14.1.1. Heart Surgery in General, Cognitive Deficits Resulting From

A significant number of patients who undergo heart surgery have been found to exhibit cognitive deficits either in the form of memory loss or learning difficulties. Studies that have sought to determine if male or female patients are more likely to suffer post-operative cognitive deficits have consistently indicated that the sexes suffer equally from these deficits (Table 7.14.1.1).

Table 7.14.1.1. Heart surgery in general, cognitive deficits resulting from.

Nature of Any Difference			Postpubertal	
				Adult
Greater in males				
No signif. difference				**NORTH AMERICA** *United States*: Kadoi et al. 2001 (elderly); MF Newman et al. 2001; Hogue et al. 2002:1121 (elderly)
Greater in females				

7.14.1.2. Heart Surgery in General, Death Following

Table 7.14.1.2 shows that studies have consistently indicated that females are more likely than males to die from heart surgery.

Table 7.14.1.2. Heart surgery in general, death following.

Nature of Any Difference			Postpubertal	
				Adult
Greater in males				
No signif. difference				
Greater in females				**NORTH AMERICA** *United States*: FH Edwards et al. 1998 (death); Kahan et al. 1990 (death); Hogue et al. 1999 (death); Hogue et al. 2001

7.14.1.3. Heart Surgery in General, Speed of Recovery From

According to the available research, either males recovery from heart surgery more rapidly than females or there are no significant sex differences in this regard (Table 7.14.1.3).

Table 7.14.1.3. Heart surgery in general, speed of recovery from.

Nature of Any Difference			Postpubertal	
				Adult
Greater in males				**EUROPE** *Sweden*: Sjoland et al. 1997 **NORTH AMERICA** *United States*: KB King et al. 1994 (becoming ambulatory); Artinian & Duggan 1995; Vaccarino et al. 2003:311
No signif. difference				**NORTH AMERICA** *Canada*: KM King & Collins-Nakai 1998; *United States*: Rankin 1990
Greater in females				

7.14.2. Responses to Coronary Artery Bypass Surgery

Coronary artery bypass surgery is an increasingly common surgery for patients who have arteries that are clogged with plaque. Sex differences in responses to this surgery are reviewed below.

7.14.2.1. Coronary Artery Bypass Surgery, Survival Following

According to one study the average time males survive following coronary artery bypass surgery surpassed the time females survived (Table 7.14.2.1).

Table 7.14.2.1. Coronary artery bypass surgery, survival following.

Nature of Any Difference			Postpubertal	
				Adult
Greater in males				**NORTH AMERICA** *United States*: Christakis et al. 1995 (among heart disease patients)
No signif. difference				
Greater in females				

7.14.2.2. Coronary Artery Bypass Surgery, Death Following

The rate of death for females following coronary artery bypass surgery has been shown in nearly all studies to surpass the rates of death for males (Table 7.14.2.2).

Table 7.14.2.2. Coronary artery bypass surgery, death following.

Nature of Any Difference			Postpubertal	
				Adult
Greater in males				
No signif. difference				**NORTH AMERICA** *United States*: Athanasiou et al. 2003 (when off-pump procedures were used)
Greater in females				**EUROPE** *Sweden*: Hammar et al. 1997 **MIDDLE EAST** *Israel*: Zitser-Gurevich et al. 2002 **NORTH AMERICA** *United States*: Khan et al. 1990; Hannan et al. 1992; GT O'Connor et al. 1993; FH Edwards et al. 1994; JS Carey et al. 1995; FH Edwards et al. 1998; Vaccarino et al. 2002; SE Woods et al. 2003; Blankstein et al. 2005

7.15
RESPONSES TO DRUG TREATMENT FOR ADDICTIONS

The following tables pertain to gender differences in tendencies to benefit from treatments for various forms of drug addiction.

7.15.1. Responses to Treatment for Nicotine Addiction

One of the most addictive drugs yet discovered is nicotine. A research finding pertaining to sex differences in responses to one type of drug treatment for nicotine addiction is presented below.

7.15.1.1. Bupropion Exposure, Therapeutic Response to Nicotine Addiction

Bupropion (Zyban and Wellbutrin) are classified as antidepressants, but are herein considered as an anti-addiction drug for treating nicotine addiction. As shown in Table 7.15.1.1, the one available study concluded that male and female smokers were equally likely to remain free of further smoking when treated with bupropion.

Table 1.15.1.1. Bupropion exposure, therapeutic response to nicotine addiction.

Nature of Any Difference						Postpubertal
						Adult
Males benefit more						
No signif. difference						**NORTH AMERICA** *United States*: Gonzales et al. 2002
Females benefit more						

7.15.2. Responses to Drug Treatment for Alcohol Addiction

One drug that has been shown to have some success in treating alcohol dependency is naltrexone, which blocks the action of opioids. The minimal research surrounding possible sex differences in responses to naltrexone appears below.

7.15.2.1. Naltrexone Exposure, Effects on Adrenocorticotropin Levels

Naltrexone is an opioid receptor antagonist sometimes used for managing alcohol dependence. One study concluded that this drug had equal tendencies to increase plasma adrenocorticotropin hormone levels in males and females (Table 7.15.2.1).

Table 7.15.2.1. Naltrexone exposure, effects on adrenocorticotropin levels.

Nature of Any Difference						Postpubertal
						Adult
Greater in males						
No signif. difference						**NORTH AMERICA** *United States:* al'Absi et al. 2004 (in plasma)
Greater in females						

7.15.3. Responses to Drug Treatment for Heroin Addiction

Possible sex differences in response to a drug that has been used to treat heroin addiction are given attention in the following table.

7.15.3.1. Methadone Exposure, Effects on Corticosterone Levels

Methadone is used to treat heroin addiction. According to the one available study, there is no significant sex difference among rats in the tendency for corticosterone to increase after animals were given methadone (Table 7.15.3.1).

Table 7.15.3.1. Methadone exposure, effects on corticosterone levels.

Nature of Any Difference						Postpubertal
						Adult
Greater in males						
No signif. difference						**RODENT** *Rat*: Bartolome & Kuhn 1983 (in the increase after methadone treatment)
Greater in females						

7.16
RESPONSES TO DRUG TREATMENT FOR ALL OTHER CONDITIONS

In the following section, attention is given to the limited research on gender differences in responses to drug treatment for all conditions that were not considered in earlier sections.

7.16.1. Responses to Assorted Drugs

So far, only one drug fits into this created category. Findings from this study are specified below.

7.16.1.1. Physostigmine Exposure, Effects on Corticosterone Levels

Physostigmine is a parasympathomimetic drug used to treat glaucoma and to alleviate various reactions to overdosing on atropine, scopolamine, and other anticholinergics. One study of rats suggested that corticosterone levels in the blood of females rose more than in the blood of males after treatment with phsyostigmine (Table 7.16.1.1).

Table 7.16.1.1. Physostigmine exposure, effects on corticosterone levels.

Nature of Any Difference					Postpubertal	
						Adult
Greater in males						
No signif. difference						
Greater in females						**RODENT** *Rat*: ME Rhodes et al. 2001 (in the plasma)

7.17
RESPONSES TO NON-DRUG TREATMENT (OR TO TREATMENT IN GENERAL) FOR DISEASES AND DISORDERS

The following tables pertain to gender differences in responses to non-drug treatments (and for treatments in general) for both physical and mental/behavioral diseases and disorders.

7.17.1. Theraputic Responses to Non-Drug Treatments for Mental Illnesses

Studies that have examined possible gender differences and responses to non-drug treatments for mental illnesses are reviewed below.

7.17.1.1. Non-Drug Therapeutic Responses to Treatment for Depression

A limited number of studies have sought to determine if one sex responds more favorably to treatment for depression than does the other. As shown in Table 7.17.1.1, the results are not all consistent, and may substantially depend upon the type of treatment administered.

Table 7.17.1.1. Therapeutic responses to treatment for depression.

Nature of Any Difference					Postpubertal	
						Adult
Males benefit more						**NORTH AMERICA** *United States*: Thase et al. 1994 (cognitive therapy); Pajer 1995 (general treatment)
No signif. difference						**NORTH AMERICA** *United States*: Jarrett et al. 1994 (cognitive therapy)
Females benefit more						**RODENT** *Rat*: Woolleyet al. 1961 (electroshock therapy, animal model of depression)

7.17.1.2. Overall Therapeutic Responses to Treatment for Schizophrenia

Relatively little research has been published regarding any gender differences in overall response to treatment of persons with schizophrenia. Most of what is available indicates that females benefit more than males do from most forms of treatment (Table 7.17.1.2).

Table 7.17.1.2. Overall therapeutic responses to treatment for schizophrenia.

Nature of Any Difference				Postpubertal		Multiple Age Categories
				Adolescent	Adult	
Males benefit more						
No signif. difference						**NORTH AMERICA** *Canada*: Labelle et al. 2001
Females benefit more				**EUROPE** *Finland*: Salokangas 1983*	**EUROPE** *Finland*: Salokangas 1983* **NORTH AMERICA** *Canada*: Seeman 1985; *United States*: Angermeyer et al. 1990	

7.17.1.3. Favorably Responding to Treatment for Drug Abuse/Addiction

Many psychoactive drugs have addictive qualities for significant proportions of users, with the main drugs of addiction including alcohol, cocaine, methamphetamine, and heroin. Addiction often manifests itself in terms of repeated use of the drug even with their serious legal or health consequences. As shown in Table 7.17.1.3, the research has come to mixed conclusions regarding any sex difference in treatment success. Most studies, however, report that females are more often successful in becoming drug free or that there is no significant sex difference in treatment outcome.

Table 7.17.1.3. Favorably responding to treatment for drug abuse/addiction.

Nature of Any Difference					Postpubertal	Multiple Age Categories
					Adult	
Males benefit more					**NORTH AMERICA** *United States*: Luchansky et al. 2000 (multiple drug addicts)	
No signif. difference					**NORTH AMERICA** *United States*: Vannicelli 1984 (alcohol abuse); JC Marsh & Miller 1985 (multiple drug abuse); Anglin et al. 1987 (heroin addicts); Hser et al. 1987 (heroin addicts); McLellan et al. 1994 (multiple drug addiction); Alterman et al. 2000; JH Foster et al. 2000 (alcoholism); Gerstein & Johnson 2000; CA Green et al. 2004:63 (multiple drug addicts)	**NORTH AMERICA** *United States*: JW Allen 1992; KM Schneider et al. 1995 (alcoholics); Messina et al. 2000; Veach et al. 2000 (multiple drug addictions)
Females benefit more					**EUROPE** *Finland*: Kosten et al. 1993; *Sweden*: B Andersson et al. 1983 **NORTH AMERICA** *United States*: Annis & Liban 1980 (alcoholism); De Leon & Jainchill 1982; Sanchez-Craing et al. 1989 (alcoholism); Sanchez-Craig et al. 1991 (alcoholism); Kosten et al. 1993 (opiate addicts); Kranzler et al. 1996 (multiple drug addicts); Project MATCH Research Group 1997 (alcohol abuse); Weiss et al. 1997 (cocaine addicts); Kosten et al. 2000 (cocaine addicts)	

7.17.1.4. Time Spent in Drug Rehabilitation by Drug Abusers/Addicts

A few studies have compared male and female drug abusers or addicts to determine if one sex spends more time in drug rehabilitation. The results have indicated either no significant gender difference or that men spend longer in treatment than do women (Table 7.17.1.4).

Table 7.17.1.4. Time spent in drug rehabilitation by drug abusers/addicts.

Nature of Any Difference					Postpubertal
					Adult
More time by males					**NORTH AMERICA** *United States*: Sansone 1980; De Leon 1984; K Knight & Hiller 1997
No signif. difference					**NORTH AMERICA** *United States*: DD Simpson et al. 1997; J Fisherman et al. 1999
More time by females					

7.17.1.5. Completion of Drug Rehabilitation

Research has reached conflicting conclusions regarding possible sex differences in the likelihood of successfully completing drug rehabilitation programs (Table 7.17.1.5). At least some of these differences may be the result of the nature of the programs being made available to clients.

Table 7.17.1.5. Successful completion of drug rehabilitation.

Nature of Any Difference					Postpubertal		Multiple Age Categories
						Adult	
Greater in males						**NORTH AMERICA** *United States*: Pelissier 2004 (prisoners)	**NORTH AMERICA** *United States*: Arfken et al. 2001
No signif. difference							**NORTH AMERICA** *United States*: Wallen 1992; Schneider et al. 1995; Messina et al. 2000; Veach et al. 2000
Greater in females							**NORTH AMERICA** *United States*: Agosti et al. 1991 (adult); Sanchez-Craig et al. 1991; Downey et al. 2003

7.17.1.6. Remaining Alcohol Free After Rehabilitation

According to one study, a greater proportion of females who had been treated for alcoholism remained alcohol free as compared to their male counterparts (Table 7.17.1.6).

Table 7.17.1.6. Remaining alcohol or drug free after rehabilitation.

Nature of Any Difference					Postpubertal		
						Adult	
More likely in males							
No signif. difference							
More likely in females						**NORTH AMERICA** *United States*: Stare et al. 2004 (alcohol free)	

7.18
RESPONSES TO PAIN

Studies of how males and females differ in response to pain have been examined in a variety of contexts, as will now be explored.

7.18.1. Behavioral Responses to Pain

A few studies have addressed the possibility that males and females respond to pain differently in behavioral terms. Findings are reported below.

7.18.1.1. Pain Exposure, Effects on Self-Administration of Opioids

A couple of studies in which rats were given the opportunity to self-administer opioid drugs in response to pain concluded that females did so to a greater degree than males (Table 7.18.1.1).

Table 7.18.1.1. Pain exposure, effects on self-administration of opioids.

Nature of Any Difference					Postpubertal		
						Adult	
Greater in males							
No signif. difference							
Greater in females						**RODENT** *Rat*: Kepler et al. 1991; Cicero et al. 1997	

7.18.1.2. Pain Exposure, Effects on Self-Administration of Morphine

Table 7.18.1.2 presents the results of two studies of humans in which subjects were allowed to self-administer morphine in response to surgical pain. One study indicated that females administered more morphine than did males, which the other concluded that there were no significant sex differences in this regard.

Table 7.18.1.2. Pain exposure, effects on self-administration of morphine.

Nature of Any Difference					Postpubertal	
						Adult
Greater in males						
No signif. difference						**NORTH AMERICA** *United States*: NC Gordon et al. 1995 (following tooth extraction)
Greater in females						**LATIN AMERICA** *Columbia*: Cepeda & Carr 2003 (following surgery, adjusted for body weight)

7.18.2. Physiological and Biochemical Responses to Pain

Possible sex differences in how the body responds to pain are addressed in the following series of tables.

7.18.2.1. Pain Exposure, Effects on Adrenocorticotropin Hormone Levels

According to the one located study, the blood plasma level of adrenocorticotropin hormone was greater in female than male rats after exposure to foot shock (Table 7.18.2.1).

Table 7.18.2.1. Pain exposure, effects on adrenocorticotropin hormone levels.

Nature of Any Difference					Postpubertal	
						Adult
Greater in males						
No signif. difference						
Greater in females						**RODENT** *Rat:* C Rivier 1999 (in the plasma, foot shock)

7.18.2.2. Pain Exposure, Effects on Blood Pressure

With only two relevant studies, findings are inconclusive regarding any sex difference in the effects of pain sensations on blood pressure (Table 7.18.2.2).

Table 7.18.2.2. Pain exposure, effects on blood pressure.

Nature of Any Difference					Postpubertal	
						Adult
Greater in males elevated						**NORTH AMERICA** *United States*: al'Absi et al. 1999
No signif. difference						**EUROPE** *Finland*: Westerland et al. 2004 (acute cold exposure)
Greater in females elevated						

7.18.2.3. Pain Exposure, Effects on Corticosterone Levels

Corticosterone is considered a stress hormone; therefore, it is expected to rise when an animal experiences pain. According to three of four studies of rats, this rise was greater for females than for males, while a fourth study found no significant difference (Table 7.18.2.3).

Table 7.18.2.3. Pain exposure, effects on corticosterone levels.

Nature of Any Difference					Postpubertal	
						Adult
Greater in males						
No signif. difference						**RODENT** *Rat*: Aloisi et al. 1996 (in plasma, formalin hindpaw injection followed by 60 minute open field task)
Greater in females						**RODENT** *Rat*: Aloisi et al. 1998 (in plasma, 30 min restraint followed by hindpaw injection of formalin followed by 60 minute open field task); MA Wilson et al. 2004 (plasma levels, during a defensive prod-burying task with either ethanol or diazepam treatment); Shors et al. 2004 (plasma levels, after inescapable tail shock)

7.18.2.4. Pain Exposure, Effects on Opioid Release

Two studies concluded that among rats males released higher quantities of opioids than did females when exposed to the same intensity of pain (Table 7.18.2.4).

Table 7.18.2.4. Pain exposure, effects on opioid release.

Nature of Any Difference					Postpubertal
					Adult
Greater in males					**RODENT** *Rat*: Kepler et al. 1991; Islam et al. 1993
No signif. difference					
Greater in females					

7.18.2.5 Pain Exposure, Effects on Skin Conductivity

Two studies reported that male skin conductivity rose more than did that of females after experiencing pain induced by electric shock (Table 7.18.2.5).

Table 7.18.2.5. Pain exposure, effects on skin conductivity.

Nature of Any Difference					Postpubertal
					Adult
Greater in males					**NORTH AMERICA** *United States*: Shmavonian et al. 1965 (electric shock); L Graham et al. 1966 (electric shock)
No signif. difference					
Greater in females					

7.19
RESPONSES TO STRESS

Stress is a difficult concept to precisely define, in part because it can result from a wide variety of causes (called stressors). For example, stressors may range from extreme exercise, to being severely injured, and having frightening experiences. Stress effects have been organized into the following five categories: (a) behavioral, (b) biochemical, (c) physiological, (d) neurological, and (e) perceptual, emotional, and cognitive.

7.19.1. Behavioral and Emotional Responses to Stress

Several studies have sought to determine how males and females differ in terms of their behavioral and emotional responses to stressful experiences. Results from these studies are shown below.

7.19.1.1. Stress Exposure, Effects on Negative Emotions

According to the one available study, a combination of stress plus nicotine inhalation caused greater subjective feelings of anxiety and discontent in males than in females (Table 7.19.1.1).

Table 7.19.1.1. Stress exposure, effects on negative emotions.

Nature of Any Difference					Postpubertal
					Adult
Greater in males					**NORTH AMERICA** *United States*: SE File et al. 2001 (non-smokers - nicotine inhalation and exposure to stress greater anxiety, discontent and aggression ratings)
No signif. difference					
Greater in females					

7.19.1.2. Stress Exposure, Effects on Cocaine Self-Administration

In two studies, no significant sex difference was found among rats regarding the extent to which stress caused them to increase their self-administration of cocaine (Table 7.19.1.2).

Table 7.19.1.2. Stress exposure, effects on cocaine self-administration.

Nature of Any Difference					Postpubertal	
						Adult
Greater in males						
No signif. difference						**RODENT** *Rat*: M Haney et al. 1995 (stress induced by social defeat in an aggressive encounter); WJ Lynch et al. 2005 (after exposure to neonatal stress)
Greater in females						

7.19.1.3. Stress Exposure, Effects on Defecation

One study was located pertaining to the effects of stress on defecation. According to this study, acute stress caused males to defecate more than females, but chronic stress increased defecation by both sexes equally (Table 7.19.1.3).

Table 7.19.1.3. Stress exposure, effects on defecation.

Nature of Any Difference					Postpubertal	
						Adult
Greater in males						**RODENT** *Rat*: GA Kennett et al. 1986* (acute restraint stress in an open field)
No signif. difference						**RODENT** *Rat*: GA Kennett et al. 1986* (chronic restraint stress in an open field)
Greater in females						

7.19.1.4. Stress Exposure, Effects on Elevated Plus Maze Performance

The elevated plus maze is commonly used in rodents to assess fearfulness or anxiety. In general the more time spent in the open arms of the maze the less anxious an animal is considered to be. As shown in Table 7.19.1.4, the findings with regards to performance on this task with either neonatal, acute or chronic stress are mixed and likely reflect differences in the parameters used to induce heightened levels of stress.

Table 7.19.1.4. Stress exposure, effects on elevated plus maze performance.

Nature of Any Difference					Postpubertal	
						Adult
Greater in males						**RODENT** *Rat*: A Wigger & Neumann 1999 (greater reduction in number of entries and amount of time spent in the open arms of an elevated plus maze after maternal deprivation as neonates P3-10); Albonetti & Farabollini 1992* (greater decrease in exploration with 15 minute acute stress on an elevated plus maze)
No signif. difference						**RODENT** *Rat*: JA Osborn et al. 1998 (ethanol exposure embryonically - equal decrease in subsequent elevated plus maze exploration after exposure to an open field stressor); Albonetti & Farabollini 1992* (in the decrease in locomotion after 30 minute restraint stress on an elevated plus maze)
Greater in females						**RODENT** *Rat*: Albonetti & Farabollini 1992* (repeated restraint stress for 1 week - greater exploration of an elevated plus maze); JA Osborn et al. 1998* (ethanol exposure embryonically - greater fear behavior during exploration)

7.19.1.5. Stress Exposure, Effects on Fluid Intake

In the two studies reviewed in Table 7.19.1.5, it was found that fluid intake after a stressful event was greater in males who received exposure to an electric shock, although it was greater in females when animals experienced social instability.

Table 7.19.1.5. Stress exposure, effects on fluid intake.

Nature of Any Difference					Postpubertal	
						Adult
Greater in males						**RODENT** *Rat*: Pericic & Pivae 1996 (drank more in response to pairing of fluid intake to a shock)
No signif. difference						
Greater in females						**RODENT** *Rat*: KJ Brown & Grunberg 1996 (greater consumption regardless of previous crowding or isolation)

7.19.1.6. Stress Exposure, Effects on Food Intake

In the one study located on the effects of stress on food intake, female rats were found to consume more food if subjected to social instability, via changes in housing conditions, than did male rats (Table 7.19.1.6).

Table 7.19.1.6. Stress exposure, effects on food intake.

Nature of Any Difference					Postpubertal	
						Adult
Greater in males						
No signif. difference						
Greater in females						**RODENT** *Rat*: KJ Brown & Grunberg 1996 (regardless of previous crowding or isolation)

7.19.1.7. Stress Exposure, Effects on Forced Swim Test

A widely used behavioral test to examine the effects of stress is the forced swim test where an animal is place in a pool of water with no opportunity to escape for a selected period of time. The amount of time spent immobile is considered indicative of the degree of stress being felt by the animal. In the one study located on neonatally stressed rats induced by neonatal handling, females were immobile for longer periods of forced swimming than were males.

Table 7.19.1.7. Stress exposure, effects on forced swim test.

Nature of Any Difference					Postpubertal	
						Adult
Greater in males						
No signif. difference						
Greater in females						**RODENT** *Rat*: Papaioannou et al. 2002 (greater immobility times during a forced swim test - handled as neonates)

7.19.1.8. Stress Exposure, Effects on Freezing Behavior

In the one pertinent study, male and female rats were found to spent equal amounts of time immobile after being subjected to footshock in an environment that they associated with the shock (Table 7.19.1.8).

Table 7.19.1.8. Stress exposure, effects on freezing behavior.

Nature of Any Difference					Postpubertal	
						Adult
Greater in males						
No signif. difference						**RODENT** *Rat*: HS Stock et al. 2001 (context associated with a shock - similar levels of freezing behavior)
Greater in females						

7.19.1.9. Stress Exposure, Effects on General Activity

Nearly all rodents exhibit some degree of increased activity as a result of being exposed to stress. As shown in Table 7.19.1.9, most studies have concluded that this is more true for females than for males. Two studies, however, did not find a sex difference.

Table 7.19.1.9. Stress exposure, effects on general activity.

Nature of Any Difference					Postpubertal	
						Adult
More increased activity/less reduced activity in males						
No signif. difference						**RODENT** *Rat*: GA Kennett et al. 1986* (chronic restraint stress-locomotion in an open field); Dunko et al. 2001 (mild chronic stress - equal open field activity)
More increased activity/less reduced activity in females						**RODENT** *Rat*: SD Mendelson & McEwen 1991 (higher levels of open field behavior after restraint stress); GA Kennett et al. 1986* (acute restraint stress, more locomotion in an open field); CH West & Michael 1988 (greater increase in locomotor activity with 5 days of pretest handling stress); Perrot-Signal et al. 1999 (exposure to weasel odor as a stressor, less reduction in vertical movement and distance traveled in an open field relative to same-sex controls)

7.19.1.10. Stress Exposure, Effects on Glucose Utilization

In all of the areas of the brain examined, one study found female rats exhibiting higher levels of glucose utilization after restraint stress than did their male counterparts (Table 7.19.1.10).

Table 7.19.1.10. Stress exposure, effects on glucose utilization.

Nature of Any Dif-ference					Postpubertal	
						Adult
Greater in males						
No signif. difference						
Greater in females						**RODENT** *Rat:* KE Brown et al. 1996 (acute restraint greater plasma glucose levels, higher glucose utilization in the medial amygdala, semsorimotor cortex, medial and lateral medial preoptic nucleus, ventro medial nucleus of the hypothalamus, arcuate habendula nucleus, CA1 and D6 of the hippocampus, splenium of the corpus callosum)

7.19.1.11. Stress Exposure, Effects on Sucrose Preference/Intake

According to one study, stress had no greater or lesser effect on sucrose preference by males than by females (Table 7.19.1.11).

Table 7.19.1.11. Stress exposure, effects on sucrose preference/intake.

Nature of Any Difference				Postpubertal		
						Adult
Greater in males						
No signif. diff.						**RODENT** *Rat*: R Dunko et al. 2001 (mild chronic stress)
Greater in females						

7.19.2. Biochemical Responses to Stress

Biochemical responses to stress are numerous. As summarized in this subsection, many studies have sought to determine if some of these responses differ according to the sex of the animal.

7.19.2.1. Stress Exposure, Effects on Adrenaline (Epinephrine)

Studies undertaken to determine how the sexes differ in adrenaline (also known as epinephrine) responses to various types of stress have revealed an apparent species difference. Among humans, males exhibit a greater elevated adrenaline response than do females. Rats, on the other hand, exhibit the opposite sex difference (Table 7.19.2.1).

Table 7.19.2.1. Stress exposure, effects on adrenaline (epinephrine).

Nature of Any Dif-ference		Postpubertal	Multiple Age Categories
	Childhood	Adult	
Elevated more in males	**EUROPE** *Sweden*: Johansson 1972 (taking exams)	**EUROPE** *Finland*: Frankenhaeuser et al. 1978 (taking exams); Rauste-von Wright & Frankenhaeuser 1989 (taking exams); *Germany*: Frankenhaeuser et al. 1976 (young); Claustre et al. 1980 (hypoglycemia stress); Sanchez et al. 1980 (exercise); Airaksinen 1998 (young); *Netherlands*: Van Doornen 1986(taking exams); *Sweden*: Johansson & Post 1974 (taking exams)	**NORTH AMERICA** *United States*: Rauste-von Wright et al. 1981
No signif. difference		**NORTH AMERICA** *United States*: Collins & Frankenhaeuser 1978 (engineering students, taking exams)	
Elevated more in females		**RODENT** *Rat*: Livezey et al. 1985 (young)	**RODENT** *Rat*: Kitav 1961; J Dunn et al. 1972; Mevel et al. 1979; GJ Kant et al. 1983

7.19.2.2. Stress Exposure, Effects on Adrenocorticotropic Hormone

Adrenocorticotropic hormone (ACTH) is released from the chromatophores of the anterior pituitary in response to corticotropin releasing hormone (factor) secreted by the hypothalamus, which in turn stimulates the release of corticosterone from the adrenal cortex, all of which are considered part of how animals respond to stressful experiences. As shown in Table 7.19.2.2, while a few studies have failed to document a significant sex difference, most studies suggest that females respond to stress with greater release of ACTH than is true for males.

Table 7.19.2.2. Stress exposure, effects on adrenocorticotropic hormone).

Nature of Any Dif-ference	Postpubertal	Multiple Age Categories
	Adult	
Male levels increase more		
No signif. difference	**RODENT** *Rat*: Farabollini et al. 1993 (plasma); Aloisi et al. 1994 (plama, restraint stress); A Chisari et al. 1995 (in the anterior pituitary)	
Female levels increase more	**NORTH AMERICA** *United States*: Gallucci et al. 1993:423 (plasma) **MAMMAL** *Sheep*: van Lier et al. 2003 (basal levels in plasma) **RODENT** *Rat:* A Chisari et al. 1995(basal plasma levels); CM McCormick et al. 1995 (among offspring of perinatally stressed mothers)	**RODENT** *Rat*: JL Dunn et al. 1972 (plasma)

7.19.2.3. Stress Exposure, Effects on Adrenocorticotropin Levels

Findings have been mixed with regard to any sex differences in adrenocorticotropin levels following exposure to the stress of the elevated plus maze (Table 7.19.2.3).

Table 7.19.2.3. Stress exposure, effects on adrenocorticotropin levels

Nature of Any Difference	Postpubertal
	Adult
Greater in males	**RODENT** *Rat:* A Wigger & Neumann 1999* (change in plasma level with elevated plus maze exposure after neonatal maternal separation)
No signif. difference	**RODENT** *Rat:* H Stock* et al. 2000 (in plasma, after exposure to an elevated plus maze with chronic diazepam pre-treatment)
Greater in females	**RODENT** *Rat:* A Wigger & Neumann 1999* (absolute plasma levels with or without neonatal maternal separation in response to elevated plus maze exposure); H Stock* et al. 2000

7.19.2.4. Stress Exposure, Effects on Catecholamine Levels

The available evidence based on studies of rats suggests that catecholamine levels are elevated more in females than in males as a result of stressful experiences (Table 7.19.2.4).

Table 7.19.2.4. Catecholamine levels in response to stress.

Nature of Any Dif-ference	Postpubertal	
	Adolescent	Adult
Elevated more in males		
No signif. difference		
Elevated more in females	**RODENT** *Rat*: Heinskbroek et al. 1990 (plasma)	**RODENT** *Rat*: Livezey et al. 1985 (young, plasma); Livezey et al. 1987 (young, plasma)

7.19.2.5. Stress Exposure, Effects on Corticosteroid-Binding Globulin

According to one study, corticosteroid-binding globulin is decreased in female rats more than in male rats following prolonged stress (Table 7.19.2.5).

Table 7.19.2.5. Stress exposure, effects on corticosteroid-binding globulin.

Nature of Any Difference					Postpubertal
					Adult
Greater in males					
No signif. difference					
Greater in females					**RODENT** *Rat*: Galea et al. 1997 (following 21 day of restraint stress)

7.19.2.6. Stress Exposure, Effects on Corticosterone

Research concerning the effects of stress on corticosterone has been examined in several studies, most often with rats. As shown in Table 7.19.2.6, the findings have not been entirely consistent, but most studies have concluded that females exhibit a greater elevation in corticosterone than do males.

Table 7.19.2.6. Stress exposure, effects on corticosterone.

Nature of Any Difference					Postpubertal
	Infant				Adult
Greater in males	**BIRD** *Chicken:* RH Marin et al. 2002 (plasma, water immersion stress 15 days post hatching)				**RODENT** *Rat*: Haller et al. 1999 (greater increase in plasma levels after defeat in an aggressive encounter); Papaioannou et al. 2002 (plasma, forced swim, handled as neonates)
No signif. difference	**RODENT** *Rat*: B Fernandez et al. 1999: 135 (neonatal naltrindole exposure, swim stress)				
Greater in females					**RODENT** *Rat*: JL Dunn et al. 1972; Kant et al. 1983; Livezey et al. 1985; Kennett et al. 1986; MA Wilson & Biscardi 1994 (acute swim); Wigger & Neumann 1999 (plasma, forced swimming); Stock et al. 2000; Wigger & Neumann 1999 (plasma, elevated plus maze); Park et al. 2003 (levels in handled animals, stressed and not stressed); MA Wilson et al. 2004 (either ethanol or diazepam treatment) **RODENT** *Rat*: M Coleman et al. 1998 (plasma, forced exercise)

7.19.2.7. Stress Exposure, Effects on Corticotropin Releasing Factor mRNA levels

According to one study of voles, levels of corticotrophin releasing factor (CRF) mRNA, which is necessary for the production of CRF, were statistically equivalent for males and females as a result of being stressed (Table 7.19.2.7).

Table 7.19.2.7. Stress exposure, effects on corticotropin releasing factor mRNA levels.

Nature of Any Difference					Postpubertal
					Adult
Greater in males					
No signif. difference					**RODENT** *Prairie Vole*: Lui et al. 2001 (in the paraventricular nucleus of the hypothalamus mRNA levels, after swim stress)
Greater in females					

7.19.2.8. Stress Exposure, Effects on Cortisol Levels

Several studies have investigated the effects of stress on cortisol levels in humans. As shown in Table 7.19.2.8, these studies suggest there is no sex difference before puberty, but that females experience greater increases than males following puberty.

Table 7.19.2.8. Stress exposure, effects on cortisol levels.

Nature of Any Difference	Prepubertal		Postpubertal	Multiple Age Categories
	Early Childhood	Childhood	Adult	
Elevated more in males				
No signif. difference	**NORTH AMERICA** *United States*: Gunnar et al. 1997; Tout et al. 1998; Dettling et al. 1999; Dettling et al. 2000; Donzella et al. 2000	**NORTH AMERICA** *United States*: LA Schmidt et al. 1997 (young); EP Davis et al. 1999 (young)		
Elevated more in females			**NORTH AMERICA** *United States*: Kirschbaum et al. 1992 (young, plasma); Gallucci et al. 1993:423 (plasma)	**NORTH AMERICA** *United States*: Frankenhaeuser et al. 1978 (plasma); Epel et al. 1999 (plasma)

7.19.2.9. Stress Exposure, Effects on Growth Hormone Release

According to two studies, male rats release more growth hormones than female rats when under comparable levels of stress (Table 7.19.2.9).

Table 7.19.2.9. Stress exposure, effects on growth hormone release.

Nature of Any Difference	Postpubertal
	Adult
Greater in males	**RODENT** *Rat*: Knat et al. 1983; CA Blake et al. 1984
No signif. difference	
Greater in females	

7.19.2.10. Stress Exposure, Effects on Morphine Tolerance

A study of morphine tolerance in rats that were stressed by isolation from their dams during early development concluded that among rats no significant gender difference could be documented (Table 7.19.2.10).

Table 7.19.2.10. Behavioral stress effects on morphine tolerance.

Nature of Any Difference	Postpubertal
	Adult
Greater in males	
No signif. difference	**RODENT** *Rat*: Kalinichev et al. 2001 (maternal separation P2-14 equal development of morphine tolerance)
Greater in females	

7.19.2.11. Stress Exposure, Effects on Arginine Vasopressin Release

According to the available research, evidence of sex differences among rats in arginine vasopressin release is not entirely consistent (Table 7.19.2.11).

Table 7.19.2.11. Stress exposure, effects on vasopressin release.

Nature of Any Difference	Postpubertal	Multiple Age Categories
	Adult	
Greater in males	**RODENT** *Rat*: Crafton et al. 1985 (arginine vasopressin, young); Jolkkonen et al. 1986 (arginine vasopressin, young)	
No signif. difference		
Greater in females		**RODENT** *Rat*: TDM Williams et al. 1985

7.19.3. Cognitive and Emotional Responses to Stress

In the following subsection, research findings mainly having to do with how individuals cope with stress are presented. Coping styles refer to the main types of response strategies that individuals adopt when faced with stressful situations.

7.19.3.1. Adopting an Avoidance Response to Stress

The research is inconsistent regarding whether males or females adapt to stress by attempting to avoid its causes as much as possible (Table 7.19.3.1).

Table 7.19.3.1. Adopting an avoidance response to stress.

Nature of Any Difference					Postpubertal	
						Adult
Greater in males						**NORTH AMERICA** *United States*: Weidner & Collins 1993 (avoidance responses)
No signif. difference						**NORTH AMERICA** *United States*: Sigmon et al. 1995 (college); Felsten 1998 (college); Lengua & Stormshak 2000 (college)
Greater in females						**EUROPE** *Spain*: Matud 2004 **NORTH AMERICA** *United States*: Pearlin & Schooler 1978; Folkman & Lozarus 1980; Billings & Moss 1984 (bipolar depression sufferers); Ptacek et al. 1992

7.19.3.2. Adopting a Detached/Rational Response to Stress

According to various studies, either males are more likely than females to respond to stress in detached and rational ways or there is no significant sex difference in this regard (Table 7.19.3.2).

Table 7.19.3.2. Adopting a detached/rational coping response to stress.

Nature of Any Difference					Postpubertal	
						Adult
Greater in males						**EUROPE** *Spain*: Matud 2004 **NORTH AMERICA** *United States*: Pearlin & Schooler 1978; Ptacek et al. 1992
No signif. difference						**NORTH AMERICA** *United States*: M Stern et al. 1993 (medical students); Sigmon et al. 1995 (college)
Greater in females						

7.19.3.3. Adopting an Emotionally Expressive Response to Stress

A person with an emotionally expressive response to stress would exhibit their displeasure with the experience to others. As shown in Table 7.19.3.3, the findings indicate that females are more emotionally expressive toward stress than are males or that there are no significant gender differences.

Table 7.19.3.3. Adopting an emotionally expressive response to stress.

Nature of Any Difference					Postpubertal	
						Adult
Greater in males						
No signif. difference						**NORTH AMERICA** *United States*: Sigmon et al. 1995 (college); Felsten 1998 (college); Lengua & Stormshak 2000 (college)
Greater in females						**EUROPE** *Spain*: Matud 2004 **NORTH AMERICA** *United States*: Pearlin & Schooler 1978; Folkman & Lozarus 1980; Billings & Moss 1984 (bipolar depression sufferers); Ptacek et al. 1992

7.19.3.4. Adopting an Instrumental Response to Stress

Table 7.19.3.4 assesses sex differences in the degree to which people show instrumental versus expressive responses to stress. An instrumental response refers to behaviors, such as instituting changes to prevent reoccurrence of the stress. According to the available research, males are more likely than females to employ instrumental coping responses to stress.

Table 7.19.3.4. Adopting an instrumental response to stress.

Nature of Any Difference	Prepubertal				Postpubertal		Multiple Age Categories
				Childhood		Adult	
Greater in males				**NORTH AMERICA** *United States*: La Pause & Monk 1964; LC Miller et al. 1971		**NORTH AMERICA** *United States*: Gutman 1965 (young)	**NORTH AMERICA** *United States*: ME Eaton et al. 1971
No signif. difference							
Greater in females							

7.19.3.5. Adopting a Vigilant Coping Style to Stress

Behaving with increased vigilance in response to stress was found in one study to be more characteristic of females than of males (Table 7.19.3.5).

Table 7.19.3.5. Adopting a vigilant coping style to stress.

Nature of Any Difference						Postpubertal
						Adult
Greater in males						
No signif. difference						
Greater in females						**NORTH AMERICA** *United States*: Weidner & Collins 1993

7.19.3.6. Confiding Behavior in Response to Stress

When faced with stress, females appear to be more inclined than males to confide in others regarding their feelings and the detailed nature of the problems they are facing (Table 7.19.3.6).

Table 7.19.3.6. Confiding behavior (sharing personal feelings, problems, and secrets).

Nature of Any Difference					Postpubertal		Multiple Age Categories
					Adolescent	Adult	
Greater in males							
No signif. difference							
Greater in females					**ASIA** *China*: Cheng & Chan 1999; *India*: Singh-Monouf 2000	**NORTH AMERICA** *United States*: Coyne & Fiske 1992	**NORTH AMERICA** *Canada*: R Lyons et al. 1995; R Lyons & Sullivan 1998; *United States*: Cronkite & Moos 1984; Endler & Parker 1994

7.19.3.7. Stress Exposure, Effects on Memory

Two studies were located on the effects of stress on memory among rats, and they seemed to reach essentially contrary conclusions. One study found less memory impairment among females than among males following stress. However, the other study suggested that stressed males performed better than stressed females at a different memory task (Table 7.19.3.7).

Table 7.19.3.7. Behavioral stress effects on memory.

Nature of Any Difference						Postpubertal
						Adult
Greater recognition/less impairment in males						**RODENT** *Rat*: KD Beck & Luine 2002 (chronic restraint stress, object recognition memory with single housing)
No signif. difference						
Greater recognition/less impairment in females						**RODENT** *Rat*: Luine 2002 (chronic restraint stress, impairment on object recognition and spatial memory tasks)

7.19.4. Physiological Responses to Stress

Various physiological responses to stress have been investigated regarding possible gender differences. Findings are summarized in the following tables.

7.19.4.1. Stress Exposure, Effects on Amphetamine Sensitization

The one study of amphetamine sensitization subsequent to social isolation failed to find any significant sex difference in the likelihood to develop sensitization (Table 7.19.4.1).

Table 7.19.4.1. Behavioral stress effects on amphetamine sensitization.

Nature of Any Difference						Postpubertal
						Adult
Greater in males						
No signif. difference						**RODENT** *Rat*: IC Weiss et al. 2001 (social isolation)
Greater in females						

7.19.4.2. Stress Exposure, Effects on Blood Pressure

Several studies have assessed blood pressure responses to stress with regards to possible gender differences being found. Table 7.19.4.2 indicates that following adolescence, the blood pressure of males is elevated more by stress than is the blood pressure of females. Prior to adolescence, however, significant sex differences have not been found.

Table 7.19.4.2. Stress exposure, effects on blood pressure.

Nature of Any Difference	Prepubertal	Postpubertal	Multiple Age Categories
	Early Childhood	Adult	
Greater elevation in males		**NORTH AMERICA** *United States*: GD James et al. 1988; KA Matthews & Stoney 1988; Stoney et al. 1988; U Lundberg et al. 1989; Girdler et al. 1990; KA Matthews et al. 1991; Engebretson & Matthews 1992; Lawler et al. 1995 **RODENT** *Rat*: Zukowska-Grojec et al. 1991 (handling & cold 4°C)	**NORTH AMERICA** *United States*: Frankenhaeuser et al. 1976; Stoney et al. 1987; MT Allen et al. 1993; KC Light et al. 1993; Maixner & Humphrey 1993; Epel et al. 1999
No signif. difference	**NORTH AMERICA** *United States*: Frodi & Lamb 1978 (in response to the sound of crying babies); KA Matthews et al. 1990		
Greater elevation in females			

7.19.4.3. Stress Exposure, Effects on Body Temperature

The body temperature of females was found to increase more than that of males in response to open field stress, according to the one available study (Table 7.19.4.3).

Table 7.19.4.3. Stress exposure, effects on body temperature.

Nature of Any Dif-ference	Postpubertal
	Adult
Greater increase in males	
No signif. difference	
Greater increase in females	**RODENT** *Guinea Pig*: MC Diamond & Fewell 1999 (core temperature in response to open field stress)

7.19.4.4. Stress Exposure, Effects on Body Weight

One study reached somewhat different conclusions regarding the effects of two different types of stress on sex differences in body weight reductions. Stress caused by aggressive encounters seemed to reduce the body weight of males more than that of females, but stress caused by group housing affected the sexes equally (Table 7.19.4.4).

Table 7.19.4.4. Behavioral stress effects on body weight.

Nature of Any Dif-ference	Postpubertal
	Adult
Greater decrease in males	**RODENT** *Rat*: JE Haller et al. 1999* (body weight after defeat in an aggressive encounter)
No signif. difference	**RODENT** *Rat*: Haller et al. 1999* (body weight after moving from isolation to group housing conditions)
Greater decrease in females	

7.19.4.5. Stress Exposure, Effects on Heart Tachycardia

Tachycardia is an abnormally rapid beating of the heart. One study of rodents indicated that males suffered this abnormality more than females when subjected to stress (Table 7.19.4.5).

Table 7.19.4.5. Behavioral stress effects on heart.

Nature of Any Difference	Postpubertal
	Adult
Greater in males	**RODENT** *Rat*: Zukowska-Grojec et al. 1991 (handling & cold 4°C greater tachychardia)
No signif. difference	
Greater in females	

7.19.4.6. Stress Exposure, Effects on Heart Rate

Numerous studies have sought to determine if heart rates increase more for one sex than for the other during times of stress. Table 7.19.4.6 shows that the results have been quite mixed.

Table 7.19.4.6. Stress exposure, effects on heart rate.

Nature of Any Dif-ference					Postpubertal		Multiple Age Categories
					Adolescent	Adult	
Greater in males increase					**NORTH AMERICA** *United States*: H Steiner et al. 2002 (when required to give a speech)	**NORTH AMERICA** *United States*: Hokanson & Edelman 1966; K Matthews et al. 1991; Lai & Linden 1992 (anger provocation); K Davidson et al. 1994	
No signif. difference						**EUROPE** *Italy*: Carrillo et al. 2001 (public speaking); Sgoifo et al. 2002 (public speaking) **NORTH AMERICA** *United States*: Collins & Frankenhaeuser 1978 (engineering students, taking exams)	**NORTH AMERICA** *United States*: Stoney et al. 1987
Greater in females increase					**ASIA** *Russia*: Anishchenko et al. 2001	**EUROPE** *Sweden*: Van Egeren 1979 (during a competitive game) **NORTH AMERICA** *United States*: L Graham et al. 1966; Hastrup & Light 1984; Stoney et al. 1987; K Matthews & Stoney 1988; Saab et al. 1989; Weidner et al. 1989 (during hostility and anger); Girdler et al. 1990; Stoney 1992; Litschauer et al. 1998; Tardy & Allen 1998 (making self-disclosures); Fichera & Andreassi 2000 (public speaking)	**NORTH AMERICA** *United States*: Frankenhaeuer 1979

7.19.4.7. Stress Exposure, Effects on Skin Conductivity

Studies have not been consistent with respect to a possible gender differences in the extent to which human skin conductivity is altered by stress (Table 7.19.4.7).

Table 7.19.4.7. Stress exposure, effects on skin conductivity.

Nature of Any Dif-ference						Postpubertal
						Adult
Greater in males						**NORTH AMERICA** *United States*: Craig & Lowery 1969 (observing others being shocked); Nicosia et al. 1979 (in a crowded room)
No signif. d ifference						**NORTH AMERICA** *United States*: SM Berger 1962 (observing others being shocked)
Greater in females						**NORTH AMERICA** *United States*: Aronfreed et al. 1953 (listening to unpleasant language); R Buck 1972 (when required to shock another person)

7.19.4.8. Stress Exposure, Effects on Weight of the Adrenal Gland

Under prolonged stress, the adrenal glands tend to enlarge. Research with rodents either suggest that females exhibit a greater increase in adrenal gland weight than males when stressed or that there is no significant sex difference (Table 7.19.4.8).

Table 7.19.4.8. Stress exposure, effects on weight of the adrenal glands.

Nature of Any Dif-ference						Postpubertal
						Adult
Greater in males						
No signif. difference						**RODENT** *Mouse*: MA Coleman et al. 1998 (after forced exercise); *Rat*: JE Haller et al. 1999* (after defeat in an aggressive encounter)
Greater in females						**RODENT** *Rat*: Jezova et al. 2002 (adults from dams food stressed during pregnancy); Haller et al. 1999* (after moving from isolation to group housing conditions); Viveros et al. 1988 (exposure to social isolation or crowding)

7.20

GENERAL PHYSIOLOGICAL RESPONSES TO ENVIRONMENTAL FACTORS

As a final section to this chapter, attention is given to possible sex differences in physical responses to factors in the environment such as light and odor.

7.20.1. Responses to Light

The available research on sex differences in physiological responses to light (and/or heat) is presented in the following two tables.

7.20.1.1. Light and Heat Exposure, Effects on Adrenocorticotropin Levels

According to one study, females exhibit greater elevation of adrenocorticotropin plasma levels than do males after spending significant time in a sauna (Table 7.20.1.1).

Table 7.20.1.1. Light and heat exposure, effects on adrenocorticotropin levels.

Nature of Any Difference	Postpubertal
	Adult
Greater in males	
No signif. difference	
Greater in females	**EUROPE** *Slovakia*: Jezova et al. 1994 (in the plasma, after 20 minutes of sauna exposure)

7.20.1.2. Light Exposure, Effects on Melatonin

Most studies have found no significant sex differences in how people's melatonin levels respond to light exposure (Table 7.20.1.2).

Table 7.20.1.2. Light exposure, effects on melatonin.

Nature of Any Difference	Postpubertal
	Adult
Suppressed more in males	
No signif. difference	**NORTH AMERICA** *United States*: Boyce & Kennaway 1987 **OCEANIA** *Australia*: Nathan et al. 2000; Nathan et al. 2000
Suppressed more in females	**EUROPE** *Italy*: Monteleone et al. 1995

Chapter 8
PERSONALITY AND GENERAL BEHAVIOR

Traits having to do with gender differences in personality and behavior will be reviewed in this chapter. Some traits are of a minor and very specific nature, such how one normally sits or carries books, while others pertain to broad-ranging traits, such as assertiveness and inquisitiveness. This chapter suggests that despite assertions that few sex differences have been scientifically documented, males and females differ on average with respect to many personality and general behavioral traits.

8.1
PERSONALITY/GENERAL BEHAVIOR TRAITS

It is difficult to precisely define either personality or general behavioral traits, and therefore, distinguishing between them is even more debatable. Nevertheless, for the sake of this section, personality is considered the most consistent and enduring aspect of an individual's behavioral repertoire. General behavioral traits, on the other hand, are fairly consistent traits, although somewhat more situation-specific.

8.1.1. Personality Traits

Personality traits have to do with the most general aspects of an individual's behavior and temperament. Without attempting to make sharp distinctions between personality traits and more specific aspects of behavior, below are summaries of findings from many studies concerning sex differences in numerous aspects of behavioral tendencies.

8.1.1.1. Achievement Orientation/Intrinsic Motivation/Ambitiousness

Achievement orientation (ambitiousness or intrinsic motivation) refers to tendencies to be self-driven and/or having the ambition and persistence to accomplish difficult feats. These tendencies are usually measured with self-reported questionnaire items. Table 8.1.1.1 reveals mixed results, with most studies suggesting that males are at least somewhat more achievement oriented than females.

Table 8.1.1.1. Achievement orientation/intrinsic motivation/ambitiousness.

Nature of Any Difference	Prepubertal				Postpubertal		Multiple Age Categories
				Childhood	Adolescent	Adult	
Males more				**NORTH AMERICA** *United States*: Veroff 1969:97; Hollander & Marcia 1970; Dweck et al. 1978	**NORTH AMERICA** *Canada*: Marcotte et al. 1999:39 (French speaking); United *States*: Walter & Marzolf 1951 (aspirations); DS Wright 1962 (personal goals); Feltz 1978 (in athletics); Deci & Ryan 1980; JM Williams & White 1983 (in athletics); Andrade & Boulay 2003:29 (young)	**NORTH AMERICA** *United States*: Horner 1969; LW Hoffman 1972; Lorence 1987 (paid work) **EUROPE** *Britain*: Warr 1982; *Norway:* Halvorsen 1997; Nordenmark 1995 (paid work); *Multiple Countries*: Harpaz 1989 (non-financial reasons); de Vaus & McAllister 1991	**NORTH AMERICA** *United States*: Lokiec 1973 (managers with less than 5 years experience, work motivation); Forgionne & Peeters 1982:110 (managers, work motivation)
No signif. difference				**NORTH AMERICA** *United States*: Buckner & Fivush 1998:417		**EUROPE** *Norway*: Ellingsaeter 1995; *Slovakia***:** Kusa 2002:354* (college) **NORTH AMERICA** *United States*: Kaufman & Fetters 1980 (professionals); W Lacy et al. 1983; R Rowe & Snizek 1995; JT Spence & Buckner 2000:49 (self-reported ambition)	**NORTH AMERICA** *United States*: Wherry & South 1977 (paid workers, work motivation)
Females more						**EUROPE** *Britain*: N Nicholson & West 1988 (managers) **NORTH AMERICA** *United States*: CD Miller et al. 1990 **OCEANIA** *Australia*: RM Clarke 1986 (in medical school)	

8.1.1.2. Aggressiveness

The tendency to have an aggressive personality may not be synonymous with engaging in physical aggression. The few studies located on having generally aggressive tendencies rated males higher than females in two cases, while a third study found no significant difference (Table 8.1.1.2).

Table 8.1.1.2. Aggressiveness.

Nature of Any Difference						Multiple Age Categories
Males more						**EUROPE** *Finland*: Kokko & Pulkkinen 2005 **NORTH AMERICA** *United States*: Huesmann et al. 1984
No signif. difference						**EUROPE** *Finland*: Pulkkinen & Pitkanen 1993 (peer-rated)
Females more						

8.1.1.3. Assertiveness

Assertiveness has to do with the degree to which individuals are forceful and persistent in their efforts to obtain things that they desire or to persuade others of a particular point of view. Most studies that have measured assertiveness have been based either on self-reports or on ratings given by parents or teachers.

As shown in Table 8.1.1.3, numerous studies drawn from a variety of diverse cultures have largely concluded that males are more assertive than females for all age groups examined. One study reached the same conclusion based on observations of prepubertal chimpanzees. Prior literature reviews have either concluded that males are more assertive than females (Maccoby & Jacklin 1974; Feingold 1994:429) or that there is no significant gender difference (JA Hall 1994).

Table 8.1.1.3. Assertiveness.

Nature of Any Difference	Prepubertal				Postpubertal		Multiple Age Categories
				Childhood	Adolescent	Adult	
Males more				**NORTH AMERICA** *United States*: Tuddenham 1952; Goodwin 1980 (Blacks); Sgan & Pickert 1980* (kindergarten and 1st grade); BI Fagot & Leinbach 1987; Sachs 1987 (young); JE Wall & Holden 1994 (Blacks); MG Jones et al. 2000:768 **APE** *Chimpanzee*: Nadler & Braggio 1974	**AFRICA** *Nigeria*: Onyeizugbo 2003* (in school) **NORTH AMERICA** *Canada*: Aube et al. 2000:304; *United States*: Harter et al. 1997	**AFRICA** *Nigeria*: Adejumo 1981 (college); Onyeizugbo 2003* (college, self-report) **ASIA** *Japan*: GD Wilson et al. 1995 **EUROPE** *Britain*: GD Wilson et al. 1990 **NORTH AMERICA** *Canada*: Marcotte et al. 1999:39 (French speaking); *United States*: Chandler et al. 1978 (college, self report); KR Bridges et al. 1991:1239; Feingold 1994 (self-perception)	**ASIA** *Japan*: CA Thompson et al. 1991* **NORTH AMERICA** *United States*: HM Bell 1939 (socially); CA Thompson et al. 1991*
No signif. difference				**NORTH AMERICA** *United States*: Sgan & Pickert 1980* (3rd grade)		**EUROPE** *Slovakia*: Kusa 2002:354* (college) **NORTH AMERICA** *United States*: JT Spence & Buckner 2000:49 (self-report)	
Females more							

8.1.1.4. Authoritarianism

Authoritarianism is a tendency to justify one's beliefs and actions with reference to an authority figure. The two available studies of gender differences in authoritarianism both indicate that it is a tendency that is more characteristic of females than of males (Table 8.1.1.4).

Table 8.1.1.4. Authoritarianism.

Nature of Any Difference					Postpubertal		
						Adult	
Males more							
No signif. difference							
Females more						**NORTH AMERICA** *United States*: Kelman & Barclay 1963 (college); TL Good et al. 1973 (teachers in secondary school)	

8.1.1.5. Boredom Proneness

Persons who are boredom prone feel that their lives lack sufficient elements of variety and excitement. To assess tendencies toward feelings of boredom, researchers have relied on self-reports, usually by asking subjects one or more questions about how often they feel bored under various real or hypothetical conditions (Cochran et al. 1994). Most of the findings on boredom proneness have indicated that this trait is more common among males than females (Table 8.1.1.5).

Table 8.1.1.5. Boredom proneness.

Nature of Any Difference	Prepubertal				Postpubertal		Multiple Age Categories
				Childhood	Adolescent	Adult	
Males more				**NORTH AMERICA** *United States*: Vodanovich & Kass 1990*	**NORTH AMERICA** *United States*: Vodanovich & Kass 1990*	**NORTH AMERICA** *United States*: Pilkington et al. 1988 (young); Watt & Vodanovich 1992* (whites, college); Rosenblitt et al. 2001 (college); DA MacDonald & Holland 2002:1116 (college) **INTERNATIONAL** *Multiple Countries*: Sundberg et al. 1991:209 (4 countries)	**NORTH AMERICA** *United States*: Zuckerman 1979; M Zuckerman & Neeb 1980:200; Tolor 1989; Vodanovich & Kass 1990*
No signif. difference						**NORTH AMERICA** *United States*: AK Wolfgang 1988:74 (young)	
Females more						**NORTH AMERICA** *United States*: Watt & Vodanovich 1992* (Blacks, college)	

8.1.1.6. Curiosity/Inquisitiveness

One study sought to determine if one sex exceeded the other in terms of inquisitiveness. It found females exceeding males in this trait (Table 8.1.1.6).

Table 8.1.1.6. Curiosity/inquisitiveness.

Nature of Any Difference	Prepubertal
	Childhood
Males more	
No signif. difference	
Females more	**OCEANIA** *Australia*: GJ Boyle & Start 1989:484

8.1.1.7. Delayed Gratification

People's varying tendencies to delay in gratifying their desires are typically measured in children by having them engage in a task at which they succeed and are then given a choice of two possible rewards, such as a special treat now or two of the treats the following day. Table 8.1.1.7 shows that these experiments have consistently shown females being more likely to delay in gratifying their desires than are males.

Table 8.1.1.7. Delayed gratification.

Nature of Any Difference	Prepubertal		Postpubertal	Multiple Age Categories
	Early Childhood	Childhood	Adolescent	
Males more				
No signif. difference				
Females more	**NORTH AMERICA** *United States*: Logue & Chavarro 1992*	**NORTH AMERICA** *United States*: Walsh 1967; Kanfer & Zich 1974; Funder et al. 1983; Logue & Chavarro 1992*	**NORTH AMERICA** *United States*: L Weller & Berkowitz 1975	**NORTH AMERICA** *United States*: Kochanska et al. 1996

8.1.1.8. Dogmatism

Persons who are dogmatic tend to be very opinionated and to hold to their opinions no matter what evidence or logical arguments might be presented to the contrary. As shown in Table 8.1.1.8, several studies have sought to determine if gender differences exist in dogmatism, but these studies have reached very inconsistent conclusions.

Table 8.1.1.8. Dogmatism.

Nature of Any Difference	Postpubertal		Multiple Age Categories
	Adolescent	Adult	
Greater among males	**EUROPE** *Britain*: Francis 1997 **NORTH AMERICA** *United States*: Gonzalez-Tamayo 1974*; HJ Walberg 1969:49*	**NORTH AMERICA** *United States*: Alter & White 1966 (young); Heyman 1977 (young)	
No signif. difference	**NORTH AMERICA** *United States*: Pannes 1963; CC Anderson 1962	**NORTH AMERICA** *United States*: Ehrlich & Bauer 1966 (among psychiatric patients); Kilpatrick et al. 1970 (young)	**NORTH AMERICA** *United States*: Mangis 1965 (among church goers); Schmitz 1985
Greater among females	**EUROPE** *Spain*: Gonzalez-Tamayo 1974* **NORTH AMERICA** *United States*: HJ Walberg 1969*		

8.1.1.9. Extroversion

Extroversion has to do with people's varying tendencies to be spontaneous and outgoing, especially in social gatherings (Eysenck & Zuckerman 1978). Extroversion is usually measured by asking subjects questions about their preferences for being in lively social gatherings as opposed to being along or in quiet company (Francis & Pearson 1988:913).

Table 8.1.1.9 suggests that there are no strong tendencies for one gender to be more extroverted than the other, although when significant differences have been found in adulthood, they have suggested that males are more extroverted than females. The current pattern of results suggests that at least in Western countries, there may be a gradual shift from females being more extroverted among school age children to males being slightly more so in adulthood. The findings summarized in Table 8.1.1.9 suggest that Feingold's (1994:429) generalization that females are more extroverted than men needs to be questioned.

Table 8.1.1.9. Extroversion.

Nature of Any Dif-ference	Prepubertal				Postpubertal	
				Childhood	Adolescent	Adult
Males more						**EUROPE** *Britain*: Sanderman et al. 1991*; SBG Eysenck et al. 1993* (college); *Netherlands*: Sanderman et al. 1991* **NORTH AMERICA** *Canada*: SB Eysenck et al. 1993* (college) **INTERNATIONAL** *Multiple Countries*: Lynn & Martin 1997 (30 out of 37 countries)
No signif. difference					**EUROPE** *Britain*: Costello & Brachman 1962* (high school) **NORTH AMERICA** *Canada*: Costello & Brachman 1962* (high school)	**EUROPE** *Britain*: M Willmott & Brierley 1984 (Eysenck scale); *Sweden*: Klinteberg et al. 1987:692 (young) **NORTH AMERICA** *Canada*: JDA Parker et al. 1989:601 (college); *United States*: Heidbreder 1927 (college); Broom 1929 (young); Stagner 1932 (college)
Females more				**EUROPE** *Britain*: HJ Eysenck 1994:203	**NORTH AMERICA** *United States*: HJ Walberg 1969:49	**EUROPE** *Poland*: Zawadzki et al. 1995 **NORTH AMERICA** *United States*: Derlega et al. 1993 (in conversations)

8.1.1.10. Exploitiveness

Exploitiveness refers to the tendency to use others for one's own gain without intentions of ever reciprocating. As shown in Table 8.1.1.10, this tendency is more characteristic of males than of females.

Table 8.1.1.10. Exploitiveness.

Nature of Any Dif-ference	Prepubertal				Postpubertal	
				Childhood	Adolescent	Adult
Males more				**NORTH AMERICA** *United States*: Vinacke & Gullickson 1964*; Shears & Behrens 1969	**NORTH AMERICA** *United States*: Vinacke 1964* (college age form exploitive coalitions in less cooperative ways during experimental games); Vinacke & Gullickson 1964*	**NORTH AMERICA** *United States*: Vinacke & Gullickson 1964* (college); Lane & Meese 1971 (college); Leventhal & Lane 1970 (college)
No signif. difference				**NORTH AMERICA** *United States*: Vinacke 1964* (school age form exploitive coalitions in less cooperative ways during experimental games)		
Females more						

8.1.1.11. Impulsivity/Disinhibition (Acting on the Spur of the Moment)

Impulsivity (or impulsiveness) refers to people's varying tendencies to act on matters quickly, while giving little forethought to the consequences. Ways of measuring impulsivity include giving subjects various hypothetical scenarios that could elicit impulsive responses and asking them how they would respond (e.g., Arbuthnot et al. 1987:148). In the case of young children, researchers usually rely on assessments made by parents or teachers (e.g., Vitiello et al. 1990:112). Table 8.1.1.11 provides conflicting evidence regarding any gender differences in impulsivity.

Table 8.1.1.11. Impulsivity/disinhibition (acting on the spur of the moment).

Nature of Any Difference	Prepubertal		Postpubertal		Multiple Age Categories
	Early Childhood	Childhood	Adolescent	Adult	
Males more	**EUROPE** *Sweden*: B Bohm et al. 2004	**NORTH AMERICA** *Canada*: Cote et al. 2002a:614; *United States*: Logue & Chavarro 1992; M Prior et al. 1993 (8-year olds)		**ASIA** *China*: Wu et al. 2000* (middle age) **NORTH AMERICA** *United States*: Gladue 1991a (young); A Walsh & Walsh 2002:214 (college) **OCEANIA** *Australia*: SM Moore & Rosenthal 1993 (young)	**NORTH AMERICA** *United States*: M Zuckerman & Neeb 1980:200; Langhinrichsen-Rohling et al. 1998
No signif. difference		**NORTH AMERICA** *United States*: JD McKinney 1973 (in problem solving experimental tasks)	**ASIA** *China*: Wu et al. 2000*	**ASIA** *China*: Wu et al. 2000* (young) **EUROPE** *Britain*: Corulla 1987 (young); Corulla 1988* (young); *Spain*: Luengo et al. 1991:660 (young); *Sweden*: Klinteberg et al. 1987:692 (young); Rosenblitt et al. 2001 (college) (SS subscale) **NORTH AMERICA** *United States*: Luthar et al. 1996:182 (opiate addicts, retrospective childhood recollections); Mulvihill et al. 1997 (go-nogo experiments loss of inhibition due to alcohol consumption) **OCEANIA** *Australia*: Heaven 1993:70 (young)	**NORTH AMERICA** *United States*: Ketzenberger & Forrest 1998
Females more		**NORTH AMERICA** *United States*: Crick 1997		**EUROPE** *Britain*: Eysenck et al. 1985 (young); Corulla 1988* (young) **NORTH AMERICA** *Canada*: Wardell & Yeudall 1980:164 (young); C Anderson & Berdahl 2002; Keltner et al. 2003 **OCEANIA** *Australia*: Malle & Neubauer 1991:867 (young)	

8.1.1.12. Introversion (Shyness)

Introversion is usually conceived of as being the opposite of extroversion (discussed above). To the extent this is the case, the findings for sex differences in extroversion can simply be inverted to suggest sex differences in introversion. However, a few studies were located pertaining specifically to introversion or shyness. These studies, based either on self-reports or assessments made by parents and teachers, suggest no clear sex difference has yet arisen with regard to introversion (Table 8.1.1.12).

Table 8.1.1.12. Introversion (shyness).

Nature of Any Difference	Prepubertal			Postpubertal	
	Toddler	Early Childhood	Childhood	Adolescent	Adult
Males more					
No signif. difference		**NORTH AMERICA** *United States*: Goodenough 1928			**NORTH AMERICA** *United States*: IR Bell et al. 1993:41
Females more	**NORTH AMERICA** *United States*: Hattwick 1937		**NORTH AMERICA** *United States*: Terman et al. 1925 (teacher observation, extremely timid & shy)	**NORTH AMERICA** *United States*: Trumbull 1953	

8.1.2. General Behavior Traits

As the term is being used here, general behavioral traits refer to fairly broad aspects of one's behavioral repertoire, but somewhat less pervasive than in the case of personality traits. Findings of sex differences in general behavioral traits are reviewed in the following subsection.

8.1.2.1. Acting Older Than One's Age

According to one study, adolescent females were found to behave in ways that surpassed their chronological age more than did adolescent males (Table 8.1.2.1).

Table 8.1.2.1. Acting older than one's age.

Nature of Any Difference	Postpubertal
	Adolescent
Males more	
No signif. difference	
Females more	**NORTH AMERICA** *United States*: Kuhlen & Lee 1943

8.1.2.2. Acting Out

Individuals who exhibit temper tantrums when frustrated, especially in social circumstances, are said to be acting out. To measure this variable, researchers usually use questionnaire data or interviews with parents or teachers. According to all available studies, acting out is more common among males than females (Table 8.1.2.2).

Table 8.1.2.2. Acting out.

Nature of Any Difference	Prepubertal				Postpubertal	
			Early Childhood	Childhood	Adolescent	Adult
Males more			**NORTH AMERICA** *United States*: Zunich 1964 (response to failure)	**OCEANIA** *New Zealand*: Fergusson & Horwood 1997 (disruptive in school); Prochnow et al. 2001:232 (disruptive in school) **NORTH AMERICA** *Canada*: S Wilkinson et al. 1995 (disruptive in school); *United States*: Shaywitz et al. 1990 (disruptive in school); GJ Duncan et al. 1994:305; Bussing et al. 1998 (disruptive in school)	**NORTH AMERICA** *United States*: Weinstein & Geisel 1960 (young)	**NORTH AMERICA** *Canada*: Benson & Fuchs 1999 (persons who have mental retardation)
No signif. difference						
Females more						

8.1.2.3. Activity Level/Locomotor Activity

An individual's activity level will certainly vary from one day to the next, but some individuals tend to be much more active than others in the course of an average day. Numerous studies have sought evidence of gender differences, both in humans and in a variety of other animals. Due to the large number of studies, the results are summarized separately for humans and non-humans, and the studies for humans are further subdivided so that prepubertals are considered separately from adolescents and adults.

8.1.2.3a. Activity Level/Locomotor Activity (Prepubertal Humans)

Regarding prepubertal humans, Split-Table 8.1.2.2a shows that most studies have found males to be more physically active than females. This conclusion is basically consistent with the conclusion from earlier literature reviews of studies of infants and toddlers (Eaton & Enns 1986).

Split-Table 8.1.2.2a. Activity level/locomotor activity (prepubertal humans).

Nature of Any Difference	Prepubertal			
	Infant	Toddler	Early Childhood	Childhood
Males more	**NORTH AMERICA** *United States*: Gatewood & Weiss 1930*; Goodenough 1930; JM Smith 1936; JW MacFarlane et al. 1954; Knop 1956; RQ Bell 1960; Schaefer & Bayley 1963; S Phillips et al. 1978; Riese 1984; DW Campbell & Eaton 1999	**NORTH AMERICA** *United States*: W Eaton & Yu 1989	**NORTH AMERICA** *Canada*: Cossette et al. 1991:175*; *United States*: FL Goodenough 1930; Hattwick 1937; Koch 1955; DM Buss et al. 1980; Pitcher & Schultz 1983 (interactions more physically active, preschool); Poest et al. 1989	**ASIA** *Japan*: Takada et al. 1998 **EUROPE** *Luxembourg*: Guillaume et al. 1997; *Sweden*: Sunnegardh et al. 1985* (older) **NORTH AMERICA** *United States*: Kagan & Moss 1962; Shephard et al. 1980; DiPietro 1981; GW Ladd 1983 (playing games); Sunnegardh et al. 1985*; Klesges et al. 1986; Baranowski et al. 1987; McKenzie et al. 1992; Moller et al. 1992 (playing games); Baranowski et al. 1993; Sallis 1993*; Garcia et al. 1995; Janz et al. 1995; Durant et al. 1996 (young); Hovell et al. 1996; HC Kemper et al. 1996; L Myers et al. 1996 (older); Saris et al. 1996; Trost et al. 1996; Pate et al. 1997; Trost et al. 1997; Goran et al. 1998; Sallis et al. 1999; Trost & Pate 1999; Trost & Pate* 2002 (used acceterometer)
No signif. difference	**NORTH AMERICA** *Canada*: Cossette et al. 1991:175*; *United States*: KC Pratt 1932; Birns 1965; RQ Bell et al. 1971			
Females more	**NORTH AMERICA** *United States*: Gatewood & Weiss 1930 (ordered); Maccoby & Jacklin 1974; AH Buss & Plomin 1975		**NORTH AMERICA** *United States*: Klesges et al. 1990; Pate et al. 1996a	**NORTH AMERICA** *United States*: Eck et al. 1992; Janz et al. 1992; Sallis et al. 1992

8.1.2.3b. Activity Level/Locomotor Activity (Postpubertal Humans)

In the case of adolescent and adult humans, the evidence is even stronger than for prepubertal humans that males surpass females in terms of physical activity (Split-Table 8.1.2.3b). In several of these studies, leg and foot movement monitering devices have been used to make objective assessments.

Split-Table 8.1.2.3b. Activity level/locomotor activity (postpubertal humans).

Nature of Any Difference	Postpubertal		Multiple Age Categories
	Adolescent	Adult	
Males more	**EUROPE** *Britain*: N Armstrong et al. 1990; A Steptoe & Butler 1996; *Finland*: Raitakari et al. 1994; Raitakari et al. 1997; *Germany*: R Fuchs et al. 1988; *Netherlands*: HC Kemper et al. 1999; HC Kemper et al. 2001*; *Portugal*: Mota & Esculcas 2002; *Sweden*: KL Andersen et al. 1984 **NORTH AMERICA** *United States*: Kuhlen & Lee 1943 (active & restless); Godin & Shephard 1984; Gottlieb & Chen 1985; Godin & Shephard 1986; Godin et al. 1986; KJ Ferguson et al. 1989; Perusse et al. 1989; R Cohen et al. 1990; Anderssen & Wold 1992; Terre et al. 1992; Aaron et al. 1993; Sallis 1993*; Kelder at al. 1994; Zakarian et al. 1994; Winnail et al. 1995; S Craig et al. 1996; Lowry et al. 1996; Pate et al. 1996b; PR Crocker et al. 1997; RE Andersen et al. 1998; AW Garcia et al. 1998; Trost & Pate 2002* (used acceterometer) **UNGULATE** *Reindeer*: JH Mathisen et al. 2003	**EUROPE** *Netherlands*: HC Kemper et al. 2001* **NORTH AMERICA** *United States*: Cody & O'Hair 1983 (leg and foot movement when lying); MA Davis et al. 1994 (elderly); Cerone & McKeever 1998 (college, spatial activity experiences); Siegel-Hinson & McKeever 2002 (college, spatial activity experiences)	**NORTH AMERICA** *United States*: Crespo et al. 1999:1823
No signif. difference	**PRIMATE (EXCEPT APE)** *Talapoin Monkeys*: JA Wolfheim 1978	**NORTH AMERICA** *United States*: de Truck & Miller 1985 (leg and foot movement when lying); van Hitton et al. 1993 (daytime wrist movement monitor); AC Brown et al. 1995 (daytime wrist movement monitor); Jean-Louis et al. 1997 (daytime wrist movement monitor)	
Females more	**EUROPE** *Netherlands*: van Mechelen & Kemper 1995 **OCEANIA** *Australia*: Fletcher & Hattie 2005:662 (self-report)		

8.1.2.3c. Activity Level/Locomotor Activity (Prepubertal Nonhumans)

The evidence surrounding sex differences in activity levels of nonhumans has been quite mixed. Regarding prepubertal animals, one would be hard pressed to generalize for species as a whole (Split-Table 8.1.2.3c).

Split-Table 8.1.2.3c. Activity level/locomotor activity (prepubertal nonhumans).

Nature of Any Difference	Prepubertal					
	Infant	Toddler		Childhood		
Males more	**APE** *Gorilla*: A Medor 1990* (in captivity) **PRIMATE (EXCEPT APE)** *Rhesus Macaque*: Goy 1968			**APE** *Gorilla*: A Medor 1990* (captivity)		
No signif. difference				**RODENT** *Gundi*: J Gouat & Gouat 1987 (captivity)		
Females more		**BIRD** *Chicken*: RB Jones 1977a; RB Jones 1977b; RB Jones & Faure 1981; Jones & Faure 1982; Vallortigara & Zanforlin 1988		**PRIMATE (EXCEPT APE)** *Baboon*: NW Owens 1975 (field); *Rhesus Macaque*: HF Harlow 1969 (in captivity) **UNGULATE** *Sheep*: BD Sachs & Harris 1978 (in captivity)		

8.1.2.3d. Activity Level/Locomotor Activity (Postpubertal Nonhumans)

Continuing with the mixed evidence surrounding any sex differences in activity levels of nonhumans, Split-Table 8.1.2.3d, does not allow one to generalize with any confidence about any consistent patterns.

Some of the apparent inconsistencies may be the result of the particular types of conditions under which the activity levels were measured. For example, one of the common types of animal studies of activity levels involves putting animals in a novel environment and then watching to see which sex explored the territory sooner or to the greatest extent. Such a methodology is thought by some researchers to be more of a measure of general fearfulness than one of activity levels.

Split-Table 8.1.2.3d. Activity level/locomotor activity (postpubertal nonhumans).

Nature of Any Difference					Postpubertal		Multiple Age Categories
					Adolescent	Adult	
Males more						**RODENT** *Rat*: Ough et al. 1972 (reward contingent behavior); PTP Wong & Traupman 1973 (reward contingent behavior); Miller 1975 (instrumental, purposeful activity); van Hest et al. 1987a (reward contingent behavior)	
No signif. difference						**RODENT** *Mouse*: Dixon & DeFries 1968 (open field, C57BL strain); *Rat*: A Krasnoff & LM Weston 1976 (running wheel activity); A Jolley & Dreesman 1973 (open field); DA Blizard 1983* (wheel running)	
Females more					**RODENT** *Mouse*: RJ Wolf 1981 (captivity); *Rat*: Denti & Epstein 1972 (avoidance training)	**APE** *Orangutan*: TL Maple & Zucker 1978 (in captivity) **RODENT** *Mice*: TA Maimanee et al. 2003 (open field); *Rat*: FA Hitchcock 1925; Denenberg & Morton 1962 (open field); Rodier 1971; JA Gray & Lalljee 1974; A Krasnoff & Weston 1976; DR Wallace et al. 1996; AJ Wintink et al. 2003 (open field)	**RODENT** *Rat*: Slob et al. 1986 (open-field)

8.1.2.4. Aesthetic Judgment/Aesthetic Appreciation/Aesthetic Sense

Aesthetic judgments have to do with one's assessment of the beauty and artistic merit of an object or an experience. The focus of these judgments may be either natural or manmade. As shown in Table 8.1.2.4, females appear to have a keener aesthetic sense than males, although one study failed to find a significant difference.

Table 8.1.2.4. Aesthetic judgment/aesthetic appreciation/aesthetic sense.

Nature of Any Difference					Postpubertal	
					Adolescent	
Males keener						
No signif. difference					**NORTH AMERICA** *Canada*: Hakstian & Cattell 1975:303	
Females keener					**NORTH AMERICA** *United States*: Eurich & Carroll 1931; HO Barrett 1950; HJ Walberg 1969:49 (appreciation)	

8.1.2.5. Attention Seeking (Attention-Getting) Behavior

Attention-seeking (attention-getting) behavior includes a variety of joking, clowning, and "showing off" activities that cause others to laugh or otherwise pay either favorable or unfavorable attention to the individual engaging in the behavior. Table 8.1.2.5 shown that males engage in such behavior more than do females.

Table 8.1.2.5. Attention-seeking (attention-getting) behavior.

Nature of Any Difference	Prepubertal						Multiple Age Categories
				Childhood			
Males more expansive				**INTERNATIONAL** *Multiple Countries*: Castell & Goldstein 1977			**NORTH AMERICA** *United States*: AJ Chapman et al. 1980
No signif. difference							
Females more expansive							

8.1.2.6. Attending to Tasks Assigned by Others

According to two studies, girls are more prone than boys to maintain attention on tasks assigned by others (usually adults; Table 8.1.2.6).

Table 8.1.2.6. Attending to tasks assigned by others.

Nature of Any Difference	Prepubertal				Postpubertal	
				Childhood		Adult
Males more						**NORTH AMERICA** *United States*: Whittenburg et al. 1956 (Mackwork Clock Test, poorer sustained attention)
No signif. difference						
Females more				**NORTH AMERICA** *United States*: J Roberts & Baird 1972:6; Burns & Owen 1990 (in school); Warrick & Naglieri 1993 (in school) **OCEANIA** *New Zealand*: DM Fergusson & Horwood 1997:89 (teacher rating)		**NORTH AMERICA** *United States*: Waag et al. 1973 (women college students poorer sustained attention detecting signals)

8.1.2.7. Behavior in School

Behavior or conduct in school is usually assessed by teachers. The research that was located was all based on studying school aged children and adolescents. As shown in Table 8.1.2.7, studies have consistently indicated that the behavior of girls in school is considered more appropriate and acceptable than that of boys.

Table 8.1.2.7. Behavior in school.

Nature of Any Difference	Prepubertal	Postpubertal
	Childhood	Adolescent
Better for males		
No signif. difference		
Better for females	**NORTH AMERICA** *Canada*: Eiser et al. 1995b:430; *United States*: Hartley 1978; Medway & Egelson 1980; Clifton et al. 1986	**EUROPE** *Britain*: Warrington et al. 2000

8.1.2.8. Enthusiasm/Liveliness

Three studies assessed gender differences in one's tendency to be enthusiastic and lively. All attributed this trait to males more than to females (Table 8.1.2.8).

Table 8.1.2.8. Enthusiasm/liveliness.

Nature of Any Difference	Postpubertal		Multiple Age Categories
	Adolescent	Adult	
Males more	**NORTH AMERICA** *Canada*: Hakstian & Cattell 1975:307	**EUROPE** *Poland*: Szarota 1996 (dynamism)	**EUROPE** *Poland*: Szarota et al. 2005:87 (dynamism)
No signif. difference			
Females more			

8.1.2.9a. Exploratory Behavior (in General) (Human)

Exploratory (or ambulatory) behavior is typically observed and recorded by researchers. In postpubertal humans, many of the studies are based on anthropological accounts of which sex is most likely to stray long distances in search for food. When animals or prepubertal humans are being studied, researchers often introduce subjects to unfamiliar environments and then assess how far they explore within a given period of time. As one can see by examining Table 8.1.2.9a, all of the research involving humans consistently indicates that males engage in more wide-ranging exploratory behavior than do females.

Split-Table 8.1.2.9a. Exploratory behavior (in general) (human).

Nature of Any Difference	Prepubertal				Postpubertal		Multiple Age Categories
	Infant	Toddler	Early Childhood	Childhood	Adolescent	Adult	
More among males	**NORTH AMERICA** *United States*: JW Anderson 1972	**AFRICA** *South Africa*: Sluckin 1980:436 (!Kung Tribe) **NORTH AMERICA** *United States*: SB Messer & Lewis 1972:31	**AFRICA** *Ivory Coast*: Dasen et al. 1985 (Baoule Tribe); *Kenya*: Munroe & Munroe 1971 (Logoli tribe); Nerlove et al. 1971 (Logoli tribe) **NORTH AMERICA** *United States*: S Goldberg & Lewis 1969; J Anderson & Tindall 1972; Ley & Koepke 1982	**AFRICA** *Mahe Island*: M Benedict & Benedict 1982:261 **NORTH AMERICA** *United States*: Coates & Bussard 1974; R Moore & Young 1978; RA Hart 1979; Webley 1981; Herman et al. 1987 **INTERNATIONAL** *Multiple Countries*: Sebba 1994	**NORTH AMERICA** *Canada*: Payne & Jones 1977; *United*: VanVliet 1983	**AFRICA** *Prehistoric Africa*: Ruff 1987 **LATIN AMERICA** *Columbia*: Chagnon 1977 (Yanomamo) **NORTH AMERICA** *United States*: K Hill & Kaplan 1988 (Ache Tribe); Cerrelli 1992 (miles driven per year); K Hill & Hurtado 1996 (Ache Tribe)	**AFRICA** *Central African Republic*: Hewlett et al. 1986 (AKA Pygmies of Africa)
No signif. difference							
More among females							

8.1.2.9b. Exploratory Behavior (in General) (Non-Human)

When animals or prepubertal humans are being studied, researchers often introduce subjects to unfamiliar environments and then assess how far they explore within a given period of time. Animal responses to these conditions are generally considered indicators of a lack of fear. Split-Table 8.1.2.8b indicates that, as in humans, nonhuman primate males appear to explore more than their female counterparts. However, among rodents, most studies have found exploratory behavior to be more characteristic of females than of males.

Studies of whether males or females make more frequent excursions away from familiar territories, and the social support such territories offer, have been conducted among numerous species. As shown in Table 9.1.7.5, these studies have concluded that males do so more often than females. Some efforts to generalize about the types of species in which sex differences in roaming are most pronounced have concluded that it is especially common among species in which monogamous pair bonding is least common (PJ Greenwood 1980; Ecuyer-Dab & Robert 2004).

Split-Table 8.1.2.9b. Exploratory behavior (in general) (non-human).

Nature of Any Difference	Prepubertal				Postpubertal		Multiple Age Categories
	Infant				Adolescent	Adult	
More among males	**PRIMATE (EXCEPT APE)** *Rhesus Monkey*: GD Jensen & Bobbitt 1968				**RODENT** *Meadow Vole*: Gaulin & FitzGerald 1989*	**APE** *Chimpanzee*: Wrangham 1979; Wrangham 1986 **RODENT** *Meadow Vole*: Gaulin & FitzGerald 1986*; Gaulin & FitzGerald 1988; *Mouse*: Streng 1971 (in open field); J Masur et al. 1980 (in open field); Kvist & Selander 1987; Tropp & Markus 2001* (proximinal landmark); *Rat*: Sines 1961* (in open field); WW Beatty et al. 1976 (in open field); Palanza et al. 2001* (after crowding)	**FELINE** *Caracal*: Avenant & Nel 1998; *Leopard*: Mizutani & Jewell 1998; *Stoat*: Alterio 1998; Samson & Raymond 1998 **MUSTELID** *Ferret*: Norbury et al. 1998 **PRIMATE (EXCEPT APE)** *Orangutan*: Rodman 1984; Galdikas 1988; *Siamang*: Chivers 1974; *Tarsier*: Bearder 1987 **RODENT** *Mouse*: EC Simmel et al. 1976; *Rat*: Behrends et al. 1986; Randall 1991; Ribble & Stanley 1998 **MAMMAL** *Several Species*: LE Brown 1966
No signif. difference						**RODENT** *Mouse*: McClearn 1960; ZM Nagy & Forrest 1970* (locomotion in open field); ZM Nagy & Glaser 1970* (locomotion in an open field); D Blizard 1971 (locomotion in open field); *Pine Vole*: Gaulin & FitzGerald 1986*; *Rat*: Sines 1961* (bred for ulcer susceptibility, locomotion in an open field); J Archer 1974* (Long-Evans Wistar, Sprague-Dawley strains, locomotion in open field); *Rat*: PA Russell 1977* (number of explorations in novel or familiar areas); PA Russell 1977* (exploring novel object in familiar environment)	**RODENT** *Mouse*: Dixon & DeFries 1968; Manosevitz 1970
More among females					**RODENT** *Rat*: WJ Meyers 1962 (considered an indicator of a lack of fear); HH Swanson 1966 (considered an indicator of a lack of fear); WW Beatty 1979; Romero & Chen 2004 (open-field)	**RODENT** *Hamster*: HH Swanson 1966* (emerge from an enclosure sooner & ambulate more in open field); HH Swanson 1969 (young); *Mouse*: JA Gray et al. 1965 (more locomotion & more exploratory responses in an open field); GM Harrington 1972 (more locomotion in open field); Quadagno et al. 1972 (more exploratory responses in an open field); J Archer 1974* (Long-Evans strains, more locomotion in open field); Nagy & Glaser 1970* (more locomotion in open field); A Saylor & Salmon 1971* (more locomotion in open field); Valle 1970 (young); Priestnall 1973* (more exploratory responses & locomotion in open field); DA Blizard et al. 1975 (more exploratory responses & more locomotion in open field); *Rat*: EE Anderson 1940 (considered an indicator of a lack of fear); Broadhurst 1957; Zimbardo & Montgomery 1957; WJ Richards & Leslie 1962 (explore novel area more with or without food and/or water deprivation); Woods 1962; JA Gray 1971a (young); GA Harrington 1972; J Archer 1975*; PA Russell 1977* (longer time exploring new area after release); JF Hyde & Jerussi 1983; Guillamon et al. 1990; Farabollini et al. 1999; Brotto et al. 2000 (open-field); Palanza et al. 2001* (after being socially isolated); Tropp & Markus 2001* (distal landmark); *Mouse*: JH Bruell 1969 (less locomotion in an open field); P Gray & Cooney 1982 (open-field, maze); *Rat*: EE Anderson 1940 (open field); Thompson 1953; PG Zimbardo & Montgomry 1957; ND Henderson 1963 (open field); CT Snowden et al. 1964 (open field); JA Gray 1965 (open field); RN Hughes 1968 (open field); KP Satinder 1968 (open field); JA Gray et al. 1969 (open field); Barrett & Ray 1970 (shuttle-box test, open field, Lashley III maze); PA Russell 1971 (open field); H Imada 1972 (open field); J Masur 1972; K Vale 1972 (open field); DI Williams & Russell 1972 (open field); PA Russell 1973; KP Satinder & Hill 1974; Archer 1979 (open field); Meng & Drugan 1993 (open-field); Brotto et al. 2000 (open-field); Tropp & Markus 2001 (open-field); Romero & Chen 2004 (open-field)	**RODENT** *Mouse*: Oliverio et al. 1972; *Rat*: Simmel et al. 1965; J Archer 1975*; Slob et al. 1986

8.1.2.10. Time Elapsing Between Entry Into a Novel Environment and Exploratory Behavior

Quite a number of studies of rodents have compared males and females with regard to the amount of time elapsing between when an animal enters a novel enclosure and they begin to actively explore. As shown in Table 8.1.2.10, the studies are not consistent regarding any sex difference in regard to the time lapse.

Table 8.1.2.10. Time elapsing between entry into a novel environment and exploratory behavior.

Nature of Any Difference					Postpubertal	
					Adult	
More among males					**RODENT** *Mouse*: GM Harrington 1972 (takes longer to emerge); Quadagno et al. 1972 (take longer to emerge)	
No signif. difference						
More among females					**RODENT** *Mouse*: WJ Meyers 1962 (take longer to emerge from cage in an open field); A Saylor & Salmon 1971 (take longer to emerge into open field)	

8.1.2.11. Fussiness/Irritability

Fussiness is the tendency to be unusually active and irritable. The two studies to report any gender difference came to inconsistent conclusions. One involved newborns, which concluded that males were more fussy than females. The other study of somewhat older infants came to the opposite conclusion (Table 8.1.2.11).

Table 8.1.2.11. Fussiness/irritability.

Nature of Any Difference	Prepubertal					
	Infant					
Males more	**NORTH AMERICA** *United States*: Moss 1974 (neonate)					
No signif. difference						
Females more	**NORTH AMERICA** *United States*: Riese 1984					

8.1.2.12. Fancifulness

Fancifulness refers to a tendency to be light-hearted and imaginative in thought and actions. The one available study found this tendency to be more pronounced in females than in males (Table 8.1.2.12).

Table 8.1.2.12. Fancifulness.

Nature of Any Difference				Prepubertal		
				Childhood		
Males more						
No signif. difference						
Females more				**NORTH AMERICA** *United States*: Sheehy 1938		

8.1.2.13. Hoarding Behavior

Hoarding refers to the tendency to hide quantities of food or other resources, usually for the purpose of later consumption or use. Both studies of this behavior – one among humans, the other among gerbils – concluded that there were no discernable gender differences in such behavior (Table 8.1.2.13).

Table 8.1.2.13. Hoarding behavior.

Nature of Any Difference						Multiple Age Categories
					Adult	
Males more						
No signif. difference					**NORTH AMERICA** *United States*: E Sherman & Newman 1977-78 (elderly)	**RODENT** *Gerbil*: Agren et al. 1989b
Females more						

8.1.2.14. Nest Building

The single study of nest building indicated that there was no significant gender difference among rats in this type of behavior (Table 8.1.2.14).

Table 8.1.2.14. Nest building.

Nature of Any Difference	Adult
Males more	**BIRD** *Snail Kite*: Beissinger 1987:497
No signif. difference	**RODENT** *Rat*: Kinder 1927 (thermo regulatory)
Females more	

8.1.2.15. Neatness/Cleanliness/Tidiness

Neatness/cleanliness pertains to the extent to which one avoids, or prefers to avoid, soiling one's body, clothing, and living quarters. All of the available studies have concluded that females are more prone to be neat and clean than males (Table 8.1.2.15).

Table 8.1.2.15. Neatness/cleanliness/tidiness.

Nature of Any Difference	Prepubertal	
	Early Childhood	Childhood
Males more		
No signif. difference		
Females more	**NORTH AMERICA** *United States*: LB Ames et al. 1952 (Rorschach forms)	**NORTH AMERICA** *United States*: Zelig 1962 (dislike getting dirty); Lever 1976 (in game playing); Lever 1978 (in game playing)

8.1.2.16. Resisting Temptation (Inhibiting Impulses)

Research regarding gender differences in resistance to temptation is sometimes based on self-reports or parental reports. Other times, especially with children, researchers will excuse themselves from a room in which they leave a child with clear instructions not to touch some tempting object. The findings have not been consistent with respect to any gender differences (Table 8.1.2.16).

Table 8.1.2.16. Resisting temptation (inhibiting impulses).

Nature of Any Difference	Prepubertal			Multiple Age Categories
	Toddler	Early Childhood	Childhood	
Males more resistant			**NORTH AMERICA** *United States*: RV Burton 1971* (when alone); Keasey 1971 (when alone)	
No signif. difference		**NORTH AMERICA** *United States*: RR Sears et al. 1965	**NORTH AMERICA** *United States*: Grinder 1964 (when alone); RP Walsh 1967 (when alone); Eisen 1972 (when alone); Hartig & Kanfer 1973 (when alone); Rosenkoetter 1973 (when alone)	
Females more resistant	**NORTH AMERICA** *United States*: Goldsmith et al. 1997		**NORTH AMERICA** *United States*: Rebelsky et al. 1963 (when alone); Walters & Demkow 1963 (when alone); Medinnus 1966 (when alone); WD Ward & Furchak 1968 (when alone)	**NORTH AMERICA** *United States*: Slaby & Parke 1971; Kochanska et al. 1996

8.1.2.17. Responsibility/Trustworthiness/Honest/Non-Deceptive

People have been shown to vary in their tendencies to be honest and trustworthy. To measure such tendencies among children, social scientists usually rely upon reports by parents, teachers, and peers (Loeber & Stouthamer-Loeber 1987:337). For obvious reasons, self-reports of such tendencies may not be very reliable, even on anonymous questionnaires. Some self-report questionnaires have been used to measure cheating in school, however.

Studies undertaken to determine if trustworthiness and related tendencies are associated with gender are summarized in Table 8.1.2.17. These studies are quite limited, but they indicate that females are more trustworthy than males, even according to the males' own self-reported assessments.

Table 8.1.2.17. Responsibility/trustworthiness/honest/non-deceptive.

Nature of Any Difference					Postpubertal	
					Adolescent	Adult
Males more						
No signif. difference						
Females more					**NORTH AMERICA** *United States*: Bronfenbrenner 1960 (teacher rating)	**NORTH AMERICA** *United States*: KA Harris & Morrow 1992 (self-report)

8.1.2.18. Self-Sufficiency/Resourcefulness/Independence

A self-sufficient and independent person is one who is unusually prone to rely on himself/herself for doing daily activities as well as when crises arise. While no one is totally self-sufficient, whenever statistically significant differences have been found, they have indicated that males are more self-sufficient and independent than are females (Table 8.1.2.18).

Table 8.1.2.18. Self-sufficiency/resourcefulness/independence.

Nature of Any Difference	Prepubertal				Postpubertal	
			Early Childhood		Adolescent	Adult
Males more			**NORTH AMERICA** *United States*: RR Sears et al. 1953; Beller & Neubauer 1963 (parent-reports)		**NORTH AMERICA** *Canada*: Hakstian & Cattell 1975:307; Marcotte 2002 (instrumental/self directed); *United States*: HJ Walberg 1969; Rosenberg & Simmons 1975; Marcia 1980	
No signif. difference			**NORTH AMERICA** *United States*: RR Sears et al. 1957 (mothers' reports)		**EUROPE** *Slovakia*: Kusa 2002:354* (college)	**NORTH AMERICA** *United States*: JT Spence & Buckner 2000:49 (self-report)
Females more						

8.1.2.19. Tool Use Behavior

All of the studies located on sex differences in tool use were confined to chimpanzees. These studies were unanimous in indicating that females were more likely than males to use tools (Table 8.1.2.19).

Table 8.1.2.19. Tool use behavior.

Nature of Any Difference					Postpubertal		Multiple Age Categories
						Adult	
Males more							
No signif. difference							
Female more						**APE** *Chimpanzee*: McGrew 1979 (sticks for termite fishing); Boesch & Boesch 1981 (stones to crack nuts); Joulian 1986; Lonsdorf 2005 (sticks for termite fishing)	**APE** *Chimpanzee*: Goodall 1986

8.1.2.20. Type A Behavior/Personality

A person who is said to have a Type A personality or to exhibit Type A behavior tends to anger easily, and to be under an unusual degree of stress and anxiety. They also tend to exhibit excessive achievement striving and exaggerated time urgency (DC Glass 1977; KA Matthews 1982). Research has found Type A behavior associated with a relatively high risk of heart disease (Haynes & Matthews 1988). Research findings have been quite inconsistent regarding the possibility of gender differences in Type A behavior and personality (Table 8.1.2.20).

Table 8.1.2.20. Type A behavior/personality.

Nature of Any Difference						Postpubertal	Multiple Age Categories
						Adult	
Males more							**NORTH AMERICA** *United States*: Mettlin 1976; Shekelle et al. 1976*
No signif. difference						**NORTH AMERICA** *United States*: Shekelle et al. 1976* (among employed persons, SES controlled)	
Females more						**NORTH AMERICA** *Canada*: Greenglass 1993 (managers)	**EUROPE** *Finland*: Koskenvuo et al. 1981:334

8.2
BEHAVIOR PATTERNS WITH SUBTYPES

Various behavioral patterns and personality traits that are relatively stable within an individual are the focus of the following section.

8.2.1. Pro/Anti-Social Behavior Patterns

Behavior patterns that have either prosocial or antisocial qualities about them are reviewed in the following subsection.

8.2.1.1. Charitable Behavior

Based on self-reports, one study concluded that females were more charitable than were males (Table 8.2.1.1).

Table 8.2.1.1. Charitable behavior.

Nature of Any Difference						Postpubertal
						Adult
Males more						
No signif. difference						
Females more						**NORTH AMERICA** *United States*: Thiessen & Ross 1990:302 (college)

8.2.1.2. Compassionate Behavior

The one study that was located pertaining to possible sex differences in the tendency to be compassionate indicated that no significant difference was apparent (Table 8.2.1.2).

Table 8.2.1.2. Compassionate behavior.

Nature of Any Difference						Postpubertal
						Adult
Males more						
No signif. difference						**EUROPE** *Slovakia*: Kusa 2002:355 (self rated)
Females more						

8.2.1.3. Cooperative Behavior

Cooperative behavior refers to the tendency to work with others, rather than against them, in order to obtain some objective. Most research concerning such behavior has involved challenging subjects with a game in which they have the option of either cooperating or competing with another person in order to win points or monetary rewards.

Table 8.2.1.3 shows that in most of these experimental studies, females were more likely to cooperate than were males, especially in younger age groups. With age, there seems to be a tendency for the sex differences to lessen.

Table 8.2.1.3. Cooperative behavior.

Nature of Any Difference	Prepubertal			Postpubertal		Multiple Age Categories
	Toddler	Early Childhood	Childhood	Adolescent	Adult	
Males more					**NORTH AMERICA** *United States*: Komorita 1965 (college, experimental game); Rapoport & Chammah 1965 (college, experimental game); D Mack et al. 1971 (experimental game)	
No signif. difference		**LATIN AMERICA** *Mexico*: S Kagan & Madsen 1972* **NORTH AMERICA** *United States*: S Kagan & Madsen 1972*	**NORTH AMERICA** *United States*: Harford & Cutter 1966* (Whites)	**NORTH AMERICA** *United States*: EE Sampson & Kardush 1965* (experimental game); Sibley et al. 1968* (Blacks, experimental task)	**NORTH AMERICA** *United States*: Lutzker 1961 (college, experimental game); Bixenstine & Wilson 1963 (college, experimental game); G Evans & Crumbaugh 1966 (college, experimental game)	
Females more	**NORTH AMERICA** *United States*: Minton et al. 1971	**NORTH AMERICA** *United States*: DiPietro 1981 (turn-taking)	**NORTH AMERICA** *United States*: Hartshorne et al. 1929; Vinacke & Gullickson 1964*; Harford & Cutter 1966* (Blacks); Tedeschi et al. 1968 (prisoner's dilemma game with some verbal communication); Owens & Stratton 1980 (school projects); Owens & Barnes 1982 (school projects)	**NORTH AMERICA** *United States*: Vinacke & Gullickson 1964*; EE Sampson & Kardush 1965*; SA Sibley et al. 1968* (Whites, experimental task); Ahlgren & Johnson 1979; Underwood et al. 1994 (in same-sex problem solving task)	**NORTH AMERICA** *United States*: Vinacke & Gullickson 1964* (young); Kerr & MacCoun 1985 (large group tasks); Taenzer et al. 2000:672 (completed voluntary survey)	**NORTH AMERICA** *United States*: Gannon et al. 1971; Pucel et al. 1971; Deal 2000:719 (group decision-making)

8.2.1.4. Defensive Behavior

One study of defensive behavior was located pertaining to a species of insect. It concluded that no significant sex difference was detectable (Table 8.2.1.4).

Table 8.2.1.4. Defensive behavior.

Nature of Any Difference	Postpubertal
	Adult
Males more	
No signif. difference	**INSECT** *Australian Stick Insect*: GO Bedford & Chinnick 1966 (response to tapping on glass of enclosure)
Females more	

8.2.1.5. Defiance/Rebellious/Disobedient Toward Authority

Sex differences in defiance, rebelliousness, and disobedience toward authority have either indicated that males exhibit such tendencies to a greater degree than females or that there is no significant gender difference (Table 8.2.1.5). Stated in "positive" terms, females appear to be more accepting of (or prone to yield to) authority such as parents and teachers.

Table 8.2.1.5. Defiance/rebellious/disobedient toward authority.

Nature of Any Difference	Prepubertal			Postpubertal
	Toddler	Early Childhood	Childhood	Adolescent
Males more	**NORTH AMERICA** *United States*: Berne 1930 (toward parents) **NORTH AMERICA** *United States*: Minton et al. 1971 (toward parents); Snow et al. 1983 (toward parents)	**NORTH AMERICA** *United States*: Goodenough 1928; Goodenough 1929; Caille 1933; H Koch 1955; JS Hatfield et al. 1967:376* (1-tailed significance test)	**NORTH AMERICA** *United States*: Sheehy 1938; RG Simmons & Blyth 1987 (toward parents)	**NORTH AMERICA** *United States*: HD Williams 1933 (in school); Tuma & Livson 1960; Douvan & Adelson 1966 (toward parents); J Coleman 1974:129
No signif. difference	**NORTH AMERICA** *United States*: JF Nelson 1931	**NORTH AMERICA** *United States*: MM Reynolds 1928; BA Mayer 1935; JS Hatfield et al. 1967:376* (2-tailed significance test)		
Females more				

8.2.1.6. Friendliness

Friendliness refers to the tendency to behave in a pleasant mannerr toward others and to show an interest in the welfare of others. This tendency has been shown by numerous studies to be more characteristic of females than of males (Table 8.2.1.6), a conclusion that was also reached in a meta-analysis completed by Feingold (1998:263).

Table 8.2.1.6. Friendliness.

Nature of Any Difference	Prepubertal		Postpubertal		Multiple Age Categories
	Early Childhood	Childhood	Adolescent	Adult	
Males more					
No signif. difference					
Females more	**NORTH AMERICA** *United States*: JD Walters et al. 1957; RN Walker 1962	**NORTH AMERICA** *Canada*: Pagani et al. 2001:306	**NORTH AMERICA** *Canada*: Hakstian & Cattell 1975:307; *United States*: Monge 1973 (self-reported)	**NORTH AMERICA** *United States*: LR Anderson & Blanchard 1982 (young); Gadzella & Williamson 1984 (self-reported, young); Stake 1992 (self-reported, college)	**EUROPE** *Italy*: Tomada & Schneider 1997 **NORTH AMERICA** *United States*: Cattell et al. 1970; Rafaeli 1989 (store clerks)

8.2.1.7. Hostile/Conflict Behavior

Hostility is a difficult concept to identify, especially in any quantifiable terms. Nevertheless, few would question that some individuals exhibit hostile behavior substantially more than do others. Most of the studies of this behavior are based largely on ratings by parents, teachers, or trained observers. As shown in Table 8.2.1.7, the evidence reported so far on gender differences in hostile behavior has concluded that it is more characteristic of males than of females. A limited number of studies have even reached this conclusion from studying non-human primates.

Table 8.2.1.7. Hostile/conflict behavior.

Nature of Any Difference	Prepubertal			Postpubertal		Multiple Age Categories
	Toddler	Early Childhood	Childhood	Adolescent	Adult	
Males more	**NORTH AMERICA** *United States*: Goodenough 1931	**NORTH AMERICA** *United States*: LB Ames et al. 1952; J Walters et al. 1957	**NORTH AMERICA** *United States*: PM Miller et al. 1986 (school age more conflict between same sex friends); Chung & Asher 1996; Rose & Asher 1999	**NORTH AMERICA** *United States*: Gill & Spilka 1962 (Mexican-Americans);Lempers & Clark-Lempers 1993 (more conflict between same sex friends); Furman 1996 (more conflict between same sex friends); Lindeman et al. 1997	**EUROPE** *Sweden*: Prochazka & Agren 2003 (self-rated) **NORTH AMERICA** *United States*: Rothaus & Worchel 1964 (college) **PRIMATE (EXCEPT APE)** *Squirrel Monkey*: Cubicciotti & Mason 1975 (young)	**NORTH AMERICA** *United States*: Bennett & Cohen 1959 **PRIMATE (EXCEPT APE)** *Squirrel Monkey*: Anzenberger et al. 1986
No signif. difference						
Females more						

8.2.1.8. Use of Threats

According to two studies, the use of threats was more pronounced in males than in females (Table 8.2.1.8).

Table 8.2.1.8. Use of threats.

Nature of Any Difference	Prepubertal	Postpubertal
	Childhood	Adult
Males more	**NORTH AMERICA** *United States*: Lindskold & Horai 1974	**NORTH AMERICA** *United States*: Tedeschi et al. 1970 (college)
No signif. difference		
Females more		

8.2.1.9. Kindness

One study concluded that females were more likely to be kind to others than was true for males.

Table 8.2.1.9. Kindness.

Nature of Any Difference	Postpubertal
	Adult
Males more	
No signif. difference	
Females more	**NORTH AMERICA** *United States*: JT Spence & Buckner 2000:50 (self-rated)

8.2.1.10. Morningness (vs. Eveningness)

The tendency to be a "morning person" (as opposed to being a "night person") has been studied in several studies. Regarding any sex difference, the findings have been mixed, with most studies suggesting no significant sex difference, but a substantial minority of studies suggesting that females are more likely than males to be morning persons (Table 8.2.1.10).

Table 8.2.1.10. Morningness (vs. eveningness).

Nature of Any Difference	Postpubertal	
	Adolescent	Adult
Males more		
No signif. difference	**NORTH AMERICA** *United States*: Bearpark & Michie 1987; Carskadon et al. 1998; S Kim et al. 2002	**ASIA** *Japan*: Ishihara et al. 1988 **EUROPE** *Austria*: Neubauer 1992 **NORTH AMERICA** *United States*: Posey & Ford 1981 (college); Costa et al. 1987; MR Smith & Gordon 1998:85
Females more		**EUROPE** *England*: GD Wilson 1990; *Italy*: Mecacci et al. 1991; Chelminski et al. 1997; Adan & Natale 2002:712* (college); Natale & Danesi 2002; *Spain*: Adan & Natale 2002:712* (college)

8.2.1.11. Obedience

While obedience may not always result in prosocial behavior, it is being considered here as such. Table 8.2.1.11 shows that females appear to be more obedient than males.

Table 8.2.1.11. Obedience.

Nature of Any Difference	Prepubertal	Postpubertal
	Childhood	Adults
Males more		
No signif. difference		
Females more	**NORTH AMERICA** *United States*: Douvan 1960:205 (towards parents)	**NORTH AMERICA** *United States*: Luthar et al. 1996:182 (obey rules, opiate addicts, retrospective childhood recollections)

8.2.1.12. Politeness/Considerateness

Several studies have sought to determine if males or females are more polite or considerate of others. As shown in Table 8.2.1.12, these inquiries have all determined that females surpass males regarding these behavioral tendencies.

Table 8.2.1.12. Politeness/considerateness.

Nature of Any Difference	Prepubertal			Postpubertal	
	Toddler	Early Childhood	Childhood	Adolescent	Adult
Males more				**NORTH AMERICA** *United States*: SI Woodruff et al. 1997:165 (use less polite responses when refusing offered cigarettes)	
No signif. difference					
Females more	**NORTH AMERICA** *United States*: Berne 1930	**NORTH AMERICA** *United States*: KA Martin 1998:501	**NORTH AMERICA** *United States*: Sadker & Sadker 1994	**MIDDLE EAST** *Israel*: Karniol et al. 1998 **NORTH AMERICA** *United States*: Rosenberg & Simmons 1975 (pleasing others)	**NORTH AMERICA** *United States*: Baxter 1984 (young); Skoe et al. 2002:306 (college)

8.2.1.13. Selfishness

Research on selfishness is largely confined to research involving experiments in which subjects can either share or try to obtain all of the winnings for themselves to the detriment of an opponent. The findings have been quite inconsistent with regard to any overall sex difference in selfish tendencies (Table 8.2.1.13).

Table 8.2.1.13. Selfishness.

Nature of Any Difference	Postpubertal
	Adult
Males more	**NORTH AMERICA** *United States*: D Araroff & Tedesch 1968 (experimental game); D Mack et al. 1971 (experimental game); EP Meux 1973 (experimental game); CC Eckel & Grossman 1998 (college, to an anonymous partner in an experimental game)
No signif. difference	**NORTH AMERICA** *United States*: RM Dawes et al. 1977 (experimental game); J Stockard et al. 1988; Thiessen & Ross 1990:301 (college); Mason et al. 1991 (experimental game); Orbell et al. 1994 (experimental game); GE Bolton & Katok 1995 (experimental game)
Females more	**NORTH AMERICA** *United States*: A Rapoport & Crammah 1965 (experimental game); D Mack et al. 1971 (experimental game)

8.2.1.14. Self-Serving Behavior

Self-serving behavior in prepubertals is usually defined based on observations by teachers or professional researchers. The study cited indicated that boys were more likely than girls to use rules and reprimands in self-serving ways rather than in ways that benefited the play group as a whole.

Table 8.2.1.14. Self-serving behavior.

Nature of Any Difference	Prepubertal	Postpubertal
	Early Childhood	Adult
Males more	**NORTH AMERICA** *United States*: Pitcher & Schultz 1983:57	**NORTH AMERICA** *United States*: M Zuckerman 1979:254
No signif. difference		
Females more		

8.2.1.15. Serving as Research Subjects

Four studies were located which concluded that females were more likely than males to complete research questionnaires or to otherwise serve as research subjects when asked to do so (Table 8.2.1.15).

Table 8.2.1.15. Serving as research subjects.

Nature of Any Difference	Postpubertal
	Adult
Males better	**NORTH AMERICA** *United States*: Kenrick et al. 1980 (college, experiments involving erotica)
No signif. difference	
Females better	**EUROPE** *Finland*: Pietila et al. 1995; Koivusilta et al. 1998 **NORTH AMERICA** *United States*: Bradburn 1992; Mosher & MacIan 1994:108 (college)

8.2.1.16. Tender Mindedness

Tender mindedness refers to the tendency to be very concerned with the well-being of others; it is closely related to the concept of sympathy. Limited research findings on tender mindedness concluded that females exhibit such tendencies to a greater degree than do males. A review of related literature reached the same conclusion (Feingold 1994:429) (Table 8.2.1.16).

Table 8.2.1.16. Tender mindedness.

Nature of Any Difference	Postpubertal
	Adolescent
Males more	
No signif. difference	**EUROPE** *Slovakia:* Kusa 2002:355 (college, self rated gentle and tender)
Females more	**NORTH AMERICA** *Canada*: Hakstian & Cattell 1975:307

8.2.2. Religious Behavior

Religious behavior refers to behavior that is involved in expressing one's religious beliefs and rituals. Considerable research has compared the sexes with respect to such behavior.

8.2.2.1. Involvement in Religious Activities in General

With only one exception, studies of religious activities have concluded that females are more often involved than males (Table 8.2.2.1).

Table 8.2.2.1. Involvement in religious activities in general.

Nature of Any Difference	Postpubertal		Multiple Age Categories
	Adolescent	Adult	
Males more		**NORTH AMERICA** *United States*: CC Weisfeld et al. 1983:697 (Hopi, control over religious ceremonies)	
No signif. difference			
Females more	**NORTH AMERICA** *United States*: Hollingshead 1949: 474 **MIDDLE EAST** *Kuwait*: Abdel-Khalek 2002:1034; C Smith et al. 2002:605	**ASIA** *Japan*: AS Miller 1992 (urban); Krause et al. 1999:413 (elderly) **EUROPE** *Britain*: Tarakashwar et al. 2005 (among HIV+ people coping during bereavement) **NORTH AMERICA** *Canada*: Marks 2001:258 (19th c.); *United States*: Koenig et al. 1990:129 (elderly use religious coping): Stolzenberg et al. 1995:90 (young); V King et al. 1997: 434; Pargament 1997 (elderly); JS Levin & Chatters 1998: 520 (elderly)	**NORTH AMERICA** *United States*: Blazer & Palmore 1976; Hoge & Toozen 1979; Caplow et al. 1983; Hout & Greeley 1987; de Vaus & McAlister 1987; RJ Taylor 1988 (Blacks); Cornwall 1989; Ellison et al. 1989; JS Levin et al. 1995:167 (Blacks)

8.2.2.2. Reading the Bible or Other Sacred Scriptures

Studies in North America have come to inconsistent conclusions regarding any gender differences in self-reported reading of the Bible or other holy scriptures (Table 8.2.2.2).

Table 8.2.2.2. Reading the bible or other sacred scriptures.

Nature of Any Difference	Postpubertal	
	Adolescent	Adult
Males more	**NORTH AMERICA** *United States*: PL Benson et al. 1987	
No signif. difference		
Females more		**EUROPE** *Britain*: J Harrison 1983 (Bible reading) **NORTH AMERICA** *United States*: JA Davis & Smith 1991

8.2.2.3. Praying

The available research on gender differences in time spent praying indicates that females spend more time doing so than do males (Table 8.2.2.3).

Table 8.2.2.3. Praying.

Nature of Any Difference					Postpubertal		Multiple Age Categories
						Adult	
Males more							
No signif. difference							
Females more						**NORTH AMERICA** *United States*: JA Davis & Smith 1991	**NORTH AMERICA** *United States*: Hoge et al. 1982:573

8.2.2.4. Church/Mosque/Synagogue Attendance

Church/synagogue attendance has been repeatedly found to be more frequent among females than among males. No study specific to mosque attendance was located (Table 8.2.2.4).

Table 8.2.2.4. Church/mosque/synagogue attendance.

Nature of Any Difference					Postpubertal		Multiple Age Categories
				Childhood	Adolescent	Adult	
Males more							
No signif. difference					**NORTH AMERICA** *United States*: PL Benson et al. 1986 (Catholics)	**NORTH AMERICA** *United States*: V King et al. 1997:434	
Females more				**EUROPE** *Britain*: LJ Francis & Brown 1990; LJ Francis & Brown 1991:116	**AFRICA** *South Africa*: Swart et al. 2002:392 **EUROPE** *Britain*: DL Smith 1996:1063 (teens); *Ireland*: Greer 1971:101; Kelleher et al. 1999:176 **NORTH AMERICA** *United States*: GE Dickinson 1976; HM Nelsen & Potvin 1981; GE Dickinson 1982; G Gallup 1983; Willits & Crider 1989* **OCEANIA** *Australia*: Rigby & Densley 1985:726 **INTERNATIONAL** *Multiple Countries*: Poloma & Gallup 1991	**ASIA** *Russia*: J Anderson 1993; S White et al. 1994 **EUROPE** *Britain*: J Harrison 1983 (Bible reading, young); Poloma & Gallup 1991 (internet/prayer, young); Field 1993 (young); Francis & Wilcox 1996 (college study); *Ireland*: Kelleher et al. 1999:176 **NORTH AMERICA** *United States*: Hollingshead 1949:460; Lazerwitz 1961 (young); Azzi & Ehrenberg 1975; Nelsen & Nelsen 1975 (Blacks); Blazer & Palmore 1976 (elderly); Bengtson et al. 1977 (elderly); MR Welch 1978 (Blacks); Koenig et al. 1988 (elderly); Willits & Crider 1989* (young); Iannaccone 1990; Thornton et al. 1992; L Ellis & Wagemann 1993:229 (college); JS Levin & Taylor 1993 (elderly, Blacks); JS Levin et al. 1994: S142 (elderly); Stolzenberg et al. 1995 (young); Iannaccone 1998: 1474; Ploch & Hastings 1998; RJ Taylor 1988:117; Edlund & Pande 2002	**EUROPE** *Britain*: Argyle & Beit-Hallahmi 1975; Field 1993; *Finland*: Hintikka et al. 1998 (mental health patients); Hintikka et al. 2001 **NORTH AMERICA** *Canada*: Bibby 1987:100; *United States*: Lynd & Lynd 1956:529; Shiels 1981; Ulbrich & Wallace 1983:48; RJ Taylor 1988:118 (Blacks); M Cornwall 1989 **OCEANIA** *Australia*: de Vaus 1982; McAllister 1986:202

8.2.2.5. Church/Mosque/Synagogue Membership

Studies of church membership have all concluded that females are more likely than males to be active members of a religious institution (Table 8.2.2.5).

Table 8.2.2.5. Church/mosque/synagogue membership.

Nature of Any Difference					Postpubertal		Multiple Age Categories
						Adult	
Males more							
No signif. difference							
Females more						**NORTH AMERICA** *United States*: Wingard 1982 (White); Stark & Bainbridge 1985; Greeley & Hout 1988 (young)	**EUROPE** *Britain*: Gerard 1985 **NORTH AMERICA** *Canada*: Bibby 1987:100; *United States*: Roozen 1980; Bock & Radelet 1988; McCutcheon 1988; Sandomirsky & Wilson 1990

8.2.2.6. Changing One's Religion

The two available studies have not reached consensus concerning any gender difference in the tendency to change one's religion (usually relative to the religion within which one was raised). One study concluded that males were more likely to change while the other study found no significant male-female difference (Table 8.2.2.6).

Table 8.2.2.6. Changing one's religion.

Nature of Any Difference					Postpubertal
					Adult
Males more					**EUROPE** *Britain*: BC Hayes 1996
No signif. difference					**NORTH AMERICA** *United States*: Sherkat 1991
Females more					

8.2.3. Involvement in Nonreligious Voluntary Organizations

Findings concerning gender differences in becoming members of or involved in voluntary organizations other than religious ones are summarized in the following subsection.

8.2.3.1. Involvement in Voluntary Organizations in General

The few studies of involvement in nonreligious voluntary organizations have not reached consistent conclusions (Table 8.2.3.1).

Table 8.2.3.1. Involvement in voluntary organizations in general

Nature of Any Difference					Postpubertal
					Adult
Males more					**NORTH AMERICA** *United States*: Mohai 1985 (environmentalist organization); Ozanne et al. 1999:617 (environmentalist organization)
No signif. difference					
Females more					**NORTH AMERICA** *United States*: Popielarz 1999 (gender-segregated organizations)

8.2.3.2. Union Membership

The one available study of union membership among full-time workers concluded that more members were males than female (Table 8.2.3.2).

Table 8.2.3.2. Union membership.

Nature of Any Difference			Multiple Age Categories
Males more			**NORTH AMERICA** *United States*: MA Adler 1993:455 (full-time workers)
No signif. difference			
Females more			

8.2.4. Risk-Taking

Risk-taking is behavior that puts someone in physical danger when alternative safer courses of action could be taken (Furby & Beyth-Marom 1992). Findings concerning such behavior patterns are summarized in the following subsection.

8.2.4.1. Risk-Taking/Recklessness in General

Risk-taking/reckless behavior can be thought of as the opposite of harm avoidance and cautiousness. Additional related behaviors are driving while under the influence of alcohol or drugs, taking preventive health precautions, and wearing seat belts, all of which are dealt with in separate tables.

To measure risk-taking, many methods have been employed, including self-reports and peer-ratings. For children, the preferred method has been for teachers or researchers to observe children at play and record instances in which they seem to take unnecessary risks (Ginsburg & Miller 1982; Rosen & Peterson 1990; Coppens & Gentry 1991).

Many studies have sought to determine if sex differences in risk-taking exist, most of which have concluded that males are more prone toward such behavior than females. Nevertheless, the fact that a relatively few studies have failed to document significant sex differences suggests that the extent to which males surpass females in risk-taking is fairly moderate in magnitude and depends somewhat on the exact type of risk-taking involved (Table 8.2.4.1).

Table 8.2.4.1. Risk-taking/recklessness in general.

Nature of Any Difference	Prepubertal				Postpubertal		Multiple Age Categories
			Early Childhood	Childhood	Adolescent	Adult	
Males more			**NORTH AMERICA** *United States*: HJ Ginsburg & Miller 1982*	**NORTH AMERICA** *United States*: Hurlock 1927 (self-rated); Tuddenham 1952 (peer-rated); N Kass 1964; Slovic 1966*; HJ Ginsburg & Miller 1982*; Kourilsky & M Campbell 1984; Cloninger et al. 1988; Rosen & Peterson 1990; Speltz et al. 1990; Potts et al. 1994; Potts et al. 1995	**ASIA** *India*: Verma 1991 **EUROPE** *Britain*: DA Routledge et al. 1974; *Denmark*: Arnett & Jensen 1994* **NORTH AMERICA** *Canada*: Keane et al. 1989; *United States*: Kuhlen & Lee 1943; Slovic 1966*; McManis & Bell 1968 (persons with mental retardation); HJ Walberg 1969; C Barns & Olson 1977; Starrett 1983*; Jonah 1986; Levin et al. 1988; Wyatt 1988; Fagley & Miller 1990; Lyng 1990; CE Irwin & Millstein 1991; S Moore & Rosenthal 1991b; Rowe 1991; J Kagan 1992; Lyng 1993; Rothman et al. 1993; Arnett & Jensen 1994*; Jessor et al. 1995; AS Miller & Hoffmann 1995:69*; Rudolph 1996	**ASIA** *India*: Begum & Ahmad 1986 (young) **EUROPE** *Britain*: Eysenck & Eysenck 1977; *Slovakia*: Kusa 2002:354 (college, willing to take risks); *Spain*: Zinkhan & Karande 1991*; *Sweden*: Ostrom et al. 1995 (unsafe driving) **NORTH AMERICA** *United States*: MR Green 1964; DL McManis & Bell 1968:270 (retarded adolescents seeking reward/avoiding punishment in physical skill game); Longstreth 1970 (college); Hottes & Kahn 1974 (young); Yinon et al. 1975; McGaffney 1976; T Michaels & Oetting 1979; WB Clark & Midanik 1980 (young); McInish 1982 (stock investing); Starrett 1983* (young); Finney 1984*; Beutell & Brenner 1986 (young); Chusmir & Koberg 1986; Veevers & Gee 1986 (young); Scherer 1987 (young); Parra 1988; DA Ward et al. 1988; Antonucci et al. 1990; Thiessen & Ross 1990:300 (college); M Zuckerman et al. 1990 (college); Breakwell et al. 1991 (young); Dahlback 1991; D Schneider & Morris 1991 (college); Zinkhan & Karande 1991*; DS Shaw et al. 1992 (young); Boverie et al. 1994 (young); Bonnelle 1995 (young); AS Miller & Hoffman 1995*; Sheer & Cline 1995 (young); Kohler 1996 (young); Langhinrichsen-Rohling et al. 1998 (young); Schrader & Wann 1999 (recreation activities); JT Spence & Buckner 2000:49 (self-report); Courtenay et al. 2002 (college); Hirschberger et al. 2002:127 (college)	**NORTH AMERICA** *United States*: Heilizer & Cutter 1971; Konecni et al. 1976; Bromiley & Curley 1992
No signif. difference				**MIDDLE EAST** *Israel*: Weller et al. 1976:104; Slovic 1966*	**EUROPE** *Britain*: Jamieson 1969 **NORTH AMERICA** *United States*: Wallach & Kogan 1959	**NORTH AMERICA** *United States*: Maccoby & Jacklin 1974:141; Finney 1984* (young); SJ Nixon & Parsons 1989 (young); J Arnett 1991	
Females more				**NORTH AMERICA** *United States*: Kopfstein 1973:191 (60 subjects)		**EUROPE** *Britain*: Farrington & Kidd 1977 **NORTH AMERICA** *United States*: Stapp 1986; Zeff et al. 1994	

8.2.4.2. Cautiousness

The concept of cautiousness denotes the tendency to avoid taking risks; thus it can be thought of as the opposite of risk-taking. As shown in Table 8.2.4.2, two studies of adults based on self-reports both failed to identify significant sex differences in cautiousness.

Table 8.2.4.2. Cautiousness.

Nature of Any Difference				Adolescents and Adults	
				Adolescents	
Males more					
No signif. difference				**NORTH AMERICA** *United States*: Wallach & Kogan 1959 (young); Botwinick 1966 (elderly)	
Females more					

8.2.4.3. Being Involved in a Motor Vehicle Accident as a Driver

Studies of sex differences in being the driver of a motor vehicle that is involved in an accident are summarized in Table 8.2.4.3. Such studies are primarily based on official accident investigations by police and insurance agents. The table suggests that among adolescents, males are more often involved in motor vehicle accidents than are females, but that there appears to be little sex difference among adults.

Table 8.2.4.3. Being involved in a motor vehicle accident as a drivers.

Nature of Any Difference		Postpubertal	
		Adolescent	Adult
More males involved		**EUROPE** *Spain*: Claret et al. 2003* (motor vehicle collisions, both adjusted & unadjusted for miles driven) **NORTH AMERICA** *United States*: Stamatiadis & Deacon 1995*	
No signif. difference			**EUROPE** *Spain*: Claret et al. 2003* (motor vehicle collisions, adjusted for miles driven) **NORTH AMERICA** *United States*: Stamatiadis & Deacon 1995*
More females involved			**EUROPE** *Spain*: Claret et al. 2003* (motor vehicle collisions, unadjusted for miles driven)

8.2.4.4. Driving Motor Vehicles at High Speeds

According to two studies, males tend to drive motor vehicles at higher speeds than do females (Table 8.2.4.4).

Table 8.2.4.4. Driving motor vehicles at high speeds.

Nature of Any Difference						Postpubertal
						Adult
Males better						**EUROPE** *Britain*: L Evans 1991; *Finland*: Laapotti & Keskinen 1998
No signif. difference						
Females better						

8.2.4.5. Gambling

Gambling refers to a variety of risk-taking gaming activity in which money or other items of value are wagered for the chance of receiving a high return. According to Table 8.2.4.5, most studies have indicated that males gamble significantly more often than do females (also see *Pathological/Compulsive Gambling* in Chapter 5).

Table 8.2.4.5. Gambling.

Nature of Any Difference	Prepubertal				Postpubertal		Multiple Age Categories
				Childhood	Adolescent	Adult	
Males more				**EUROPE** *Poland*: Walesa 1975* **NORTH AMERICA** *Canada*: Gupta & Derevensky 1997*; *United States*: Kass 1964; Slovic 1966	**AFRICA** *South Africa*: AJ Flisher & Chalton 1995 **EUROPE** *Britain*: Jamieson 1969; Griffiths 1990; M Griffiths & Sutherland 1998 **NORTH AMERICA** *Canada*: Gupta & Derevensky 1997*; *United States*: Lupfer et al.1971; S Snyder 1984; Winters et al. 1993; D Miller & Byrnes 1997; Proimos et al. 1998:E233; Winters & Anderson 2000; Barnes et al. 2002	**EUROPE** *Britain*: Downes et al. 1976* (self-report); Sproston et al. 2000 (self-report) **NORTH AMERICA** *United States*: Heilizer & Cutter 1971 (young); Cvetkovich 1972 (young); Zenker & Wolfgang 1982 (young); AK Wolfgang 1988 (young); AC Bruce & Johnson 1994 (amount bet); Winters et al. 1998 (college); Winters & Rich 1998 (twins); Volberg et al. 1994 (pathological gambling) **OCEANIA** *Australia*: MB Walker 1992* (except slot machines); Delfabbro 2000* (except slot machines)	**EUROPE** *Britain*: O Newman 1972; Downes et al. 1976*; DB Cornish 1978 **NORTH AMERICA** *United States*: Gebhard & Johnson 1979:92; Kallick et al. 1979; HR Greenberg 1980; Volberg & Steadman 1988; Volberg & Steadman 1989; RJ Rosenthal & Lesieur 1992; Sorrentino et al. 1992; Volberg 1994; PB Gray 2004 (high stakes); SL Hershberger & Bogaert 2005 **OCEANIA** *Australia*: Allcock 1986; Productivity Commission 1999:13
No signif. difference				**NORTH AMERICA** *United States*: CS Hayes 1973; GT Montgomery & Landers 1974; Arenson 1978	**AFRICA** *South Africa*: AJ Flisher & Chalton 1995* **EUROPE** *Germany*: Lamm 1979*; *Poland*: Walesa 1975*	**NORTH AMERICA** *United States*: Kogan & Wallach 1964; FW Irwin & Tolkmitt 1968; Welte et al. 2002	**OCEANIA** *Australia*: Ohtsuka et al. 1997
Females more				**NORTH AMERICA** *United States*: Kopfstein 1973	**EUROPE** *Germany*: Lamm 1979*	**NORTH AMERICA** *United States*: Mindock 1972 **OCEANIA** *Australia*: MB Walker 1992* (slot machines); Delfabbro 2000* (slot machines)	

8.2.4.6. Strategic (vs. Chance) Gambling

One study of problem gamblers concluded that more males than females were prone toward gambling in which there were elements of strategic planning and calculating rather than merely "chance gambling" (such as slot machines; Table 8.2.4.6).

Table 8.2.4.6. Strategic (vs. chance) gambling

Nature of Any Difference				Postpubertal	
				Adolescent	Adult
Males more				**NORTH AMERICA** *United States*: Potenza et al. 2001* (problem gamblers)	**NORTH AMERICA** *United States*: Potenza et al. 2001* (problem gamblers)
No signif. difference					
Females more					

8.2.4.7. Risky Shift Behavior

The tendency for group decision making to exhibit greater degrees of risk than the risk-taking behavior that individuals exhibit on their own is known as *risky shift behavior*. Studies have found that all-male groups are most prone toward risky shift behavior than are all-female groups (Table 8.2.4.7).

Table 8.2.4.7. Risky shift behavior.

Nature of Any Difference					Postpubertal
					Adult
All-male groups					**NORTH AMERICA** *United States*: Coet & McDermott 1979 (young); Seeborg et al. 1980 (young); DiBerardinis et al. 1984 (young)
No signif. difference					
All-female groups					
Mixed-gender groups					

8.2.4.8. Taking Health and Safety Risks

Research on gender differences in taking risks specific to one's health and safety is cited in Table 8.2.4.8. It presents a mixed picture with respect to any such differences.

Table 8.2.4.8. Taking health and safety risks.

Nature of Any Difference	Prepubertal			Postpubertal		Multiple Age Categories
			Childhood	Adolescent	Adult	
Males higher			**NORTH AMERICA** *United States*: Coppens & Gentry 1991 (videotaped playground behavior)	**AFRICA** *South Africa*: Flisher & Chalton 1995 (unsafe driving) **NORTH AMERICA** *United States*: Flaherty & Arenson 1978; MS Stanford et al. 1996*	**AFRICA** *Ethiopia*: Dessie & Larson 1991 (unsafe driving) **NORTH AMERICA** *Canada*: SS Martins et al. 2004 (risky sexual behavior among pathological gamblers); *United States*: DS Shaw et al. 1992 (young); Bonnelle 1995 (young); MS Stanford et al. 1996* (young)	**AFRICA** *Ghana*: Mock et al. 1999 (unsafe driving) **NORTH AMERICA** *United States*: Ebbesen & Haney 1973 (while driving); J Hersch 1997 (health & safety)
No signif. difference				**EUROPE** *Denmark*: Arnett & Jensen 1994* **NORTH AMERICA** *United States*: Bachman et al. 1991; Ingersoll et al. 1993; Arnett & Jensen 1994*; Dolcini & Adler 1994	**NORTH AMERICA** *United States*: Gibbons & Gerrard 1995 (young)	
Females higher				**NORTH AMERICA** *United States*: Tinsley et al. 1995	**NORTH AMERICA** *United States*: Wayment et al. 1993; Dwyer et al. 1994	

8.2.4.9. Risk Taking in Career and Business Decisions

Table 8.2.4.9 summarizes findings concerning male-female differences in career and business risk taking. It shows that most research has found males to be more prone to take such risks than are females.

Table 8.2.4.9. Risk taking in career and business decisions.

Nature of Any Difference					Postpubertal		Multiple Age Catagories
						Adult	
Males higher						**EUROPE** *Germany*: Muldrow & Bayton 1979 (business decisions) **NORTH AMERICA** *United States*: Blume & Friend 1978 (stock investing); Subich et al. 1989 (business decisions); Sexton & Bowman-Upton 1991 (business decisions); Chauvin & Ash 1994 (career decisions); Bajtelsmit & Bernasek 1996 (retirement savings); Bajtelsmit & Van Derhie 1997 (retirement savings); Bajtelsmit et al. 1997 (pension investments); Barsky et al. 1997 (prefer higher risk investing); RP Hinz et al. 1997 (retirement savings); M Powell & Ansic 1997 (young, financial investing); JC Glass & Kilpatrick 1998 (elderly; financial investing); Jianakoplos & Bernasek 1998 (financial); Eckel & Grossman 2002 (financial); Weber et al. 2002 (financial)	**NORTH AMERICA** *United States*: Jianakoplos & Berrasek 1998* (financial investing); Sunden & Surette 1998 (financial investing)
No signif. difference							
Females higher							

8.2.4.10. Risk Taking in Experimental Games

Many experimental games have been devised by researchers over the years to assess how prone people are to take risks under a variety of conditions. In some of these experiments, sex differences in risk taking have been reported. As shown in Table 8.2.4.10, most of these studies have concluded that males usually take more risks in these contrived games than do females.

Table 8.2.4.10. Risk taking in experimental games.

Nature of Any Difference					Postpubertal		Multiple Age Categories
					Adolescent	Adult	
Males higher					**NORTH AMERICA** *United* States: Hudgens & Fatkin 1985 (military experimental computer games)	**NORTH AMERICA** *United States*: Karabenick & Addy 1979 (games of chance); IP Levin et al. 1988	**NORTH AMERICA** *United States*: Calhourn 1978 (experimental computer games)
No signif. difference							
Females higher							

8.2.5. Sensation Seeking and Adventurism

Sex differences in tendencies to seek new experiences, often with an element of risk, are explored in the following section.

8.2.5.1. Sensation Seeking (General)

Sensation seeking refers to the desire for varied and complex sensations and experiences, often to the point of taking physical and social risks to have such experiences (Zuckerman 1979:10, 1994:27). As this definition implies, an important element in sensation seeking is the tendency to be reckless (Arnett 1996).

The most widely used measure for sensation seeking is a self-report scale developed in the 1960s (Zuckerman 1979, 1994:389; also see Arnett 1994). Many studies have been conducted on sensation seeking since that time (Zuckerman 1994). Throughout the world, research has indicated that there are at least three other aspects to sensation seeking: boredom susceptibility, adventure seeking, and a tendency to be spontaneous and uninhibited (Zuckerman 1971; IL Ball et al. 1983:1158).

Table 8.2.5.1 shows that females have never been found to exhibit greater sensation seeking tendencies than males, although several studies have indicated that the differences between the sexes are not statistically significant.

Table 8.2.5.1. Sensation seeking (general).

Nature of Any Difference					Postpubertal		Multiple Age Categories
					Adolescent	Adult	
Males higher					**EUROPE** *Belgium*: Simo et al. 1991; *Britain*: IL Ball et al. 1984* (adults and adolescents); *Croatia:* A Butkovic & Bratko 2003* (adolescent & adult); *Spain*: Perez & Torrubia 1985* **NORTH AMERICA** *United States*: M. Zuckerman et al. 1978* (adults, adolescents);K Baker et al. 1991; Arnett 1994:289	**ASIA** *Thailand*: Berkowitz 1967 (young) **EUROPE** *Britain*: IL Ball et al. 1984* (adults and adolescents); Zuckerman et al. 1978 (young); Furnham 1984 (young); Coventry & Hudson 2001:874 (overall SSS, gamblers); *Croatia:* A Butkovic & Bratko 2003* (adolescent & adult); *Spain*: Perez & Torrubia 1985* (young) **MIDDLE EAST** *Kuwait*: Torki 1993 (young) **NORTH AMERICA** *Canada*: O Ridgeway & Russel 1980; Rowland et al. 1986:213 (college); *United States*: M. Zuckerman et al. 1978* (adults, adolescents); Kurtz & Zuckerman 1978 (young); Zuckerman & Litle 1986 (young); Rosenblitt et al. 2001 (college); Hirschberger et al. 2002:126 (college) **OCEANIA** *Australia*: IL Ball et al. 1984 (young)	**NORTH AMERICA** *United States*: M Zuckerman & Neeb 1980:200
No signif. difference					**INTERNATIONAL** *Multiple Scandinavian Countries*: Braathen & Svebak 1992 (athletes)	**EUROPE** *Italy*: Magaro et al. 1979 (young) **NORTH AMERICA** *United States*: Farley & Cox 1971 (young); Bone et al. 1972 (young); Zuckerman 1984b (college)	
Females higher							

8.2.5.2. Thrill and Adventure Seeking (Being Venturesome)

The tendency to be a thrill seeker or adventure seeker denotes an unusual willingness to experiment with new sensations and experiences. Such tendencies often result in individuals taking extended trips into unfamiliar territories or taking rides on frightening roller coasters. Most measures of thrill and adventure seeking involve self-reports. As shown in Table 8.2.5.2, the evidence is very consistent in indicating that thrill and adventure seeking is more characteristic of males than of females.

Table 8.2.5.2. Thrill and adventure seeking (being venturesome).

Nature of Any Difference					Postpubertal		Multiple Age Categories
					Adolescent	Adult	
Males more					**EUROPE** *Britain*: M Zuckerman et al. 1978 **NORTH AMERICA** *Canada*: Hakstian & Cattell 1975:307; *United States*: M Zuckerman 1971; M Zuckerman 1978; M Zuckerman 1979; J Thorson & Powell 1987; Cochran et al. 1994:119 **OCEANIA** *Australia*: SM Moore & Rosenthal 1993	**EUROPE** *Britain*: Eysenck et al. 1985* (young); Corulla 1987 (young); Corulla 1988 (young); *Spain*: Luengo et al. 1991:660 (young) **NORTH AMERICA** *United States*: AK Wolfgang 1988:74 (young); Rosenblitt et al. 2001 **OCEANIA** *Australia*: Eysenck et al. 1985* (young)	**NORTH AMERICA** *United States*: M Zuckerman & Neeb 1980:200
No signif. difference							
Females more							

8.2.6. Sex Role Orientation Behavior

Sex role orientation refers to the various aspects of being or feeling masculine, feminine, or sometimes in between, termed androgyny.

8.2.6.1. Adherence to Sex Roles

The extent to which males and females adhere to their respective sex roles has been investigated by three studies. As shown in Table 8.2.6.1, two of these studies indicate that boys adhered to their respective sex role more than did girls, while the remaining study concluded the opposite.

Table 8.2.6.1. Adherence to sex roles.

Nature of Any Difference	Prepubertal						
			Early Childhood	Childhood			
Males more			**NORTH AMERICA** *United States*: Rabban 1950*	**NORTH AMERICA** *United States*: Rabban 1950*; Baruch & Barnett 1986; Weisner & Wilson-Mitchel 1990 (young)			
No signif. difference							
Females more			**EUROPE** *Finland*: N Sandnabba et al. 2003				

8.2.6.2. Androgyny

Persons who do not think of themselves as being inherently either masculine or feminine are said to be androgynous. Most studies of androgyny have relied on a scale developed by Bem (1975). As shown in Table 8.2.6.2, most studies indicate that males are more androgynous than females. The only partial exception involved a study that found males being more androgynous in early adulthood while females were more so in middle adulthood.

Table 8.2.6.2. Androgyny.

Nature of Any Difference	Prepubertal		Postpubertal
	Toddler	Childhood	Adult
Males more	**NORTH AMERICA** *United States*: Lansky & McKay 1963		**NORTH AMERICA** *United States*: Bem 1975 (young); Guastello & Guastello 2003:670* (young); PA Oswald 2004:1334 **OCEANIA** *Malaysia*: Noor et al. 2003:240 (college, Bem scale)
No signif. difference		**EUROPE** *Sweden*: Sorbring & Palmerus 2004 (young, sex roles)	
Females more		**NORTH AMERICA** *United States*: Baruch & Barnett 1986 (sex roles); Weisner & Wilson-Mitchel 1990 (young, sex roles)	**NORTH AMERICA** *United States*: Guastello & Guastello 2003:670* (middle-age)

8.2.6.3. Femininity

Femininity is usually assessed by asking subjects to respond to a variety of questions concerning their internal perceptions of interests and preferences as being more typical of females than of males. As the concept of femininity is most often conceptualized, it can be considered the opposite of *masculinity* (see below). Numerous studies of gender differences in femininity have been undertaken, and, as one would expect, they have unanimously concluded that females score higher than do males (Table 8.2.6.3).

Table 8.2.6.3. Femininity.

Nature of Any Difference	Prepubertal		Postpubertal		Multiple Age Categories
	Early Childhood	Childhood	Adolescent	Adult	
Males more					
No signif. difference					
Females more	**NORTH AMERICA** *United States*: D Lynn 1959 (self-assessed); Bussey & Bandura 1992:1243*	**NORTH AMERICA** *United States*: Lansky & McKay 1963	**EUROPE** *Britain*: Bannerjee & Lintern 2000; Breakwell et al. 2003:442 **NORTH AMERICA** *Canada*: Aube et al. 2000:304; *United States*: Allgood-Merten et al. 1990 (self-assessed)	**EUROPE** *Britain*: Eysenck 1971; Francis & Wilcox 1996 (college, self-assessed); *Croatia*: Hudek-Knezevic et al. 1995 (college, Bem scale); *Slovakia*: Kusa 2002:355 (college, self-rated) **LATIN AMERICA** *Chile*: Almagia 2004 (college) **NORTH AMERICA** *United States*: Franck & Rosen 1949 (projective tests); VC Crandall 1969:28 (college); Bem 1974 (self-assessed); Bem & Lenny 1976; JT Spence & Helmreich 1978 (college); Helmreich et al. 1979; Flaherty & Dusek 1980; DE Olds & Shaver 1980 (college); LC Bernard 1981 (young); Orlofsky et al. 1982; Annandale & Hunt 1990:36; Bussey & Bandura 1992:1243*; AC Harris 1994; CL Holt & Ellis 1998; JT Spence & Buckner 2000:50 (BSRI scale); Steiner-Pappalardo & Gurung 2002:318 (college, Bem scale); PA Oswald 2004:1334; BL Russel & Trigg 2004 (college) **OCEANIA** *Australia*: Farnill & Ball 1985 (college) **INTERNATIONAL** *Multiple Countries*: Reed-Sanders et al. 1984	**NORTH AMERICA** *United States*: Auster & Ohm 2000 **OCEANIA** *Australia*: M Tucker & Bond 1997:136

8.2.6.4. Masculinity

The tendency to think of oneself as being masculine has been investigated in a number of ways over the years. Nearly all of the relevant studies have all concluded that males are more masculine than are females (Table 8.2.6.4).

Table 8.2.6.4. Masculinity.

Nature of Any Difference	Prepubertal		Postpubertal		Multiple Age Categories
	Early Childhood	Childhood	Adolescent	Adult	
Males more	**NORTH AMERICA** *United States*: D Lynn 1959 (self-assessed); Bussey & Bandura 1992:1243	**EUROPE** *Britain*: Young & Sweeting 2004* (self-assessed)	**EUROPE** *Britain*: Bannerjee & Lintern 2000; Breakwell et al. 2003:442; Young & Sweeting 2004* (self-assessed) **OCEANIA** *Australia*: SM Moore & Rosenthal 1993	**EUROPE** *Britain*: Eysenck 1971; *Germany*: Runge et al. 1981; Collinson & Hearn 1994; *Ireland*: G Ryan et al. 1987 (college, BEM scale); *Slovakia*: Kusa 2002:354 (college, self-rated) **LATIN AMERICA** *Chile*: Almagia 2004 (college) **NORTH AMERICA** *United States*: Franck & Rosen 1949 (projective tests); BFA Shepler 1951 (college); Bem 1974 (self-assessed); Deaux & Emswiller 1974 (self-assessment, skilled at masculine tasks); Bem & Lenny 1976; JT Spence & Helmreich 1978 (young); Helmriech et al. 1979; Flaherty & Dusek 1980; DE Olds & Shaver 1980 (young); LC Bernard 1981; Orlofsky et al. 1982; Baruch & Barnett 1986 (ridgedly masculine sex roles); DL Chambless & Mason 1986 (anxiety patients); Annandale & Hunt 1990:36; Weisner & Wilson-Mitchel 1990 (young, ridgedly masculine sex roles); McCann et al. 1991 (college); EH Thompson et al. 1992; M Price 1993 (self-assessed, skilled at masculine tasks, financial matters); AC Harris 1994; Beyer & Bowden 1997 (self-assessed, skilled at masculine tasks); CL Holt & Ellis 1998; JT Spence & Buckner 2000:49 (BSRI scale); Steiner-Pappalardo & Gurung 2002:318 (college); Klonsky et al. 2002 (college, self-assessed); Guastello & Guastello 2003:670; PA Oswald 2004:1334; BL Russel & Trigg 2004 (college) **OCEANIA** *Australia*: Farnill & Ball 1985 (young); *Malaysia*: Noor et al. 2003:240 (college, Bem scale) **INTERNATIONAL** *Multiple Countries*: Reed-Sanders et al. 1984	**NORTH AMERICA** *United States*: Auster & Ohm 2000 **EUROPE** *Britain*: Gervai et al. 1995:121*; *Hungary*: Gervai et al. 1995:121*
No signif. difference				**NORTH AMERICA** *United States*: Jenkin & Vroegh 1969 (young) **OCEANIA** *Australia*: Heaven 1993:70 (young)	**NORTH AMERICA** *United States*: Ketzenberger & Forrest 1998
Females more				**EUROPE** *Britain*: Eysenck et al. 1985 (young); Corulla 1988 (young) **OCEANIA** *Australia*: Malle & Neubauer 1991:867 (young)	

8.2.6.5. Disclosing One's Sexual Orientation

According to the one available study, there is no greater tendency for gays than for lesbians to reveal their sexual orientation to others (Table 8.2.6.5).

Table 8.2.6.5. Disclosing ones sexual orientation.

Nature of Any Difference	Postpubertal
	Adult
Males more	
No signif. difference	**NORTH AMERICA** *United States*: Ragins et al. 2003 (at work, gay & lesbian employees)
Females more	

8.2.7. Work-Related Personality/Behavior Traits

Some behavioral traits bear rather directly on the extent to which individuals are driven toward various type of work. The following tables summarize the research pertaining to these traits.

8.2.7.1. Task-Oriented (Focused) Tenacity

The tendency to remain at a task, even in the face of discouragement for doing so, is known as task-oriented tenacity. As shown in Table 8.2.7.1, most studies have found this trait to be more characteristic of males than of females.

Table 8.2.7.1. Task-oriented (focused) tenacity.

Nature of Any Difference	Prepubertal				Postpubertal		Multiple Age Categories
				Childhood		Adult	
Males more						**NORTH AMERICA** *United States*: Spence et al. 1974 (instrumental); Deci & Ryan 1985 (goal oriented); Sonnert 1996:55; Lippa 2005 (college, instrumentality)	**NORTH AMERICA** *United States*: Aries 1987:170
No signif. difference				**NORTH AMERICA** *United States*: Luthar et al. 1996:182 (fail to complete tasks, retrospective childhood recollections by adult opiate addicts)			
Females more							

8.2.7.2. Persistence at Self-Selected Tasks

Most studies have found males being more inclined than females to persist at tasks in which they have an interest (Table 8.2.7.2).

Table 8.2.7.2. Persistence at self-selected tasks.

Nature of Any Difference	Prepubertal				Postpubertal		Multiple Age Categories
		Toddler		Childhood	Adolescent	Adult	
More in males		**NORTH AMERICA** *United States*: Andrew 1972		**NORTH AMERICA** *United States*: VJ Crandall & Rabson 1960; McManis 1965 (pursuit-rotor task); B Weiner 1966	**NORTH AMERICA** *United States*: LM Walter & Marzolf 1951	**NORTH AMERICA** *United States*: Battle 1965 (young); Deaux et al. 1975 (young); Dweck & Gilliard 1975 (young); Nicholls 1975 (young); Horvath et al. 1992 (college, economic major); JM Craig & Sherif 1986; W Wood & Karten 1986; Piliavin & Martin 1978 (college); Stonewater et al. 1990 (college faculty); JT Spence & Buckner 2000:49 (never give up) **BIRD** *Chicken*: L Rogers 1974	**NORTH AMERICA** *United States*: Carli 1989; Hutson-Comeaux 1996; Lockheed & Hall 1976
No signif. difference				**NORTH AMERICA** *United States*: H Berkowitz & Zigler 1965		**NORTH AMERICA** *United States*: Eccles 1984:99 (young); Chizmar 2000 (college, economic major)	
More in females						**NORTH AMERICA** *United States*: Sweeney et al. 1982 (college, personal persistence)	

8.2.7.3. Persistence at (Concentration on) Tasks Assigned by Others

Unlike self-selected tasks (where most studies have found males to be more task-persistent), the limited findings for tasks assigned by others have concluded that females exhibit greater task-persistence. The evidence is summarized in Table 8.2.7.3.

Table 8.2.7.3. Persistence at (concentration on) tasks assigned by others.

Nature of Any Difference	Prepubertal				Postpubertal		
				Childhood	Adolescent		
Males more							
No signif. difference							
Females more				**NORTH AMERICA** *United States*: Nakamura & Ellis 1964 (lever-pressing task with small rewards); Achenbach & Edelbrock 1981:14	**NORTH AMERICA** *United States*: BA Jacob 2002:592 (doing homework)		

8.2.7.4. Competitiveness

Competitiveness refers to tendencies to identify goals and to focus on obtaining those goals at the expense of others seeking the same goals. Competition often takes place in business ventures and in games of chance and sport. Competitiveness is measured in most studies by self-report questionnaires (e.g., Cheng & Chan 1999 & Gill 1988) in which respondents were asked to rate themselves in levels of competitiveness based on a series of questions.

Results from studies of gender differences in competitiveness are summarized in Table 8.2.7.4. Among humans, virtually all studies have concluded that males are more competitive than females, a conclusion also reached by a meta-analysis (Strube 1981). The one exception was a study conducted in Argentina, which concluded that no sex difference existed. Interestingly, one study of moorhen, a type of bird whose sex role patterns are considered "reversed" relative to most bird species, concluded that females exhibited greater competitiveness than did males. This happens to be one of only a few species of so-called sex-role reversed bird species, i.e., a species in which most of the nest brooding is performed by the male (discussed under parental investment in Chapter 9).

Table 8.2.7.4. Competitiveness.

Nature of Any Difference	Prepubertal				Postpubertal	
				Childhood	Adolescent	Adult
Males more				**ASIA** *Hong Kong*: ST Cheng & Chan 1999* **MIDDLE EAST** *India*: Banerjee & Pareek 1974; *Israel*: Shapira & Madsen 1969* (urban); Shapira & Madsen 1974:143 **NORTH AMERICA** *United States*: Vinacke & Gullickson 1964; Shears & Behrens 1969 (experimental games); Veroff 1969; Skarin & Moely 1976; Crockenberg et al. 1976; GP Knight & Kagan 1977; S Kagan et al. 1977; Ahlgren & Johnson 1979*; L Owens & Stratton 1980; L Owens & Barnes 1982	**ASIA** *China*: ST Cheng & Chan 1999*; *India*: Carment 1975*; Druckman et al. 1976* **NORTH AMERICA** *United States*: Carment 1975*; Druckman et al. 1976*; Ahlgren & Johnson 1979*; DL Gill 1988; Thiessen & Ross 1990 (college, self-rated)	**EUROPE** *Britain*: Mellanby et al. 2000:384 (college) **INTERNATIONAL** *Multiple countries*: Lynn 1993 (valuing & saving money, 20 countries university students) **NORTH AMERICA** *United States*: DC McClelland et al. 1953 (young); McCarrick et al. 1981; Kidder et al. 1982; DL Gill 1986 (college); SA White 1991 (college); Gladue & Bailey 1995b; JT Spence & Buckner 2000:49 (self-report)
No signif. difference				**MIDDLE EAST** *Israel*: Shapira & Madsen 1969* (Kibbuts children)	**LATIN AMERICA** *Argentina*: Druckman et al. 1976*	
Females more						**BIRD** *Moorhen*: Petrie 1983 ("sex role reversed" species)

8.2.7.5. Conscientiousness

Conscientiousness refers to the tendency to be extremely careful to complete any task one undertakes or is assigned. The one study relevant to this trait found it to be more prevalent in females (Table 8.2.7.5).

Table 8.2.7.5. Conscientiousness.

Nature of Any Difference	Prepubertal			Postpubertal		Multiple Age Categories
			Childhood		Adult	
Males more						
No signif. difference					**EUROPE** *Poland*: Zawadzki et al. 1995	
Females more			**NORTH AMERICA** *United States*: Hurlock 1924		**EUROPE** *Poland*: Szarota 1996	**EUROPE** *Czech Republic*: Hrebickova et al. 2000; *Poland*: Szarota et al. 2005:87

8.2.7.6. Compulsiveness

Persons who are said to be compulsive tend to be unusually prone to remain committed to a single task until it is completed. At the extreme, such persons would be considered sufferers from what is known as obsessive-compulsive disorder as discussed in Chapter 5. One study of compulsiveness found no significant gender difference in this personality trait (Table 8.2.7.6).

Table 8.2.7.6. Compulsiveness.

Nature of Any Difference							Multiple Age Categories
Males more							
No signif. difference							**NORTH AMERICA** *United States*: Ketzenberger & Forrest 1998
Females more							

8.2.7.7. Decisiveness

The tendency to be decisive (as opposed to being tentative or undecided) on issues and in decision making has been found to be more characteristic of males than of females in a couple of studies (Table 8.2.7.7).

Table 8.2.7.7. Decisiveness.

Nature of Any Difference	Postpubertal
	Adult
Males more	**EUROPE** *Netherlands*: Rassin & Muris 2005 (college) **NORTH AMERICA** *United States*: JT Spence & Buckner 2000:49 (self-report)
No signif. difference	
Females more	

8.2.7.8. Outspokenness

The tendency to express one's opinion with little or no prompting is known as outspokenness. The available studies all indicate that this tendency is more characteristic of males than of females (Table 8.2.7.8).

Table 8.2.7.8. Outspokenness.

Nature of Any Difference	Adolescents and Adults	Multiple Age Categories
	Adolescents	
Males more	**EUROPE** *Britain*: Stanworth 1981 (in school); J Baxter 1999 (in school) **NORTH AMERICA** *United States*: Sternglanz & Lyberger-Ficek 1977 (in school)	**EUROPE** *Britain*: J Holmes 1992 (in school)
No signif. difference		
Females more		

8.2.7.9. Procrastination

Studies have been somewhat inconsistent with regard to revealing a sex difference in people's tendencies to procrastinate. Research either suggests there is no significant sex difference or that procrastination is more characteristic of females than of males (Table 8.2.7.9).

Table 8.2.7.9. Procrastination.

Nature of Any Difference	Postpubertal
	Adult
Males more	
No signif. difference	**NORTH AMERICA** *United States*: Solomon & Rothblum 1984 (college); Rothblum et al. 1986 (college); Effert & Ferrari 1989 (college)
Females more	**NORTH AMERICA** *United States*: Paludi & Frankell-Hauser 1986 (college); Haycock et al. 1998 (college)

8.2.8. Specific Behavior Patterns

Behavior of a minor specific nature includes such behaviors as styles of sitting, walking, and driving motor vehicles.

8.2.8.1. Body Gestures

The tendency to exhibit body gestures was assessed in one study. It concluded that gesturing by males surpassed that by females (Table 8.2.8.1).

Table 8.2.8.1. Body gestures.

Nature of Any Difference	Prepubertal
Males more	**NORTH AMERICA** *United States*: Underwood et al. 1999 (during competition, lab experiment)
No signif. difference	
Females more	

8.2.8.2. Book Carrying Style

Gender differences in book carrying styles were first conducted in the 1970s. The data for these studies have involved observers rating subjects as they walk or stand in hallways of buildings or on college campuses.

Table 8.2.8.2 shows that these studies have all reached the same conclusion with respect to gender differences: Females are more likely to “cradle” their books with one or both arms or to rest their books on the waist, whereas males are more likely to carry the books to the side with their arms extended.

Table 8.2.8.2. Book carrying style.

Nature of Any Difference	Prepubertal				Postpubertal	
				Childhood	Adolescent	Adult
Males more “cradling”						
No signif. difference						
Females more “cradling”				**NORTH AMERICA** *United States*: Hanaway & Burghardt 1976*; Jenni & Jenni 1976*	**NORTH AMERICA** *United States*: Hanaway & Burghardt 1976*	**NORTH AMERICA** *United States*: Jenni 1976 (college); Jenni & Jenni 1976* (college); Spottswood & Burghardt 1976 (college); Jenni & Jenni 1978 (college); Scheman et al. 1977 (rest on hips); Alley & Kolker 1988 (college); McKelvei 1993 (college); Thommen et al. 1993 (college)

8.2.8.3. Contraceptive/Condom Use

A few studies have sought to determine which gender was more likely to use contraceptives to prevent unwanted pregnancy (Table 8.2.8.3). In all cases, males were more likely to do so than females, although the type of contraceptive focused on in these studies was condoms, which males usually must take the initiative to purchase and use.

Table 8.2.8.3. Contraceptive/condom use.

Nature of Any Difference					Postpubertal		Multiple Age Categories
						Adult	
Males more						**EUROPE** *Denmark*: Melbye & Biggar 1992 (during non-marital intercourse); *France*: Messiah et al. 1996 **NORTH AMERICA** *United States*: Catania et al. 1992b	**NORTH AMERICA** *United States*: Mettlin 1976; Shekelle et al. 1976
No signif. difference							
Females more							

8.2.8.4. Cuddling

Studies of cuddling have been confined to neonates (i.e., infants who are less than a year of age and are usually only a few months old). These studies have all found that compared to males, females to be more prone to cuddle with their adult caregivers, and to do so for longer durations (Table 8.2.8.4).

Table 8.2.8.4. Cuddling.

Nature of Any Difference	Prepubertal					
	Infant					
Males more						
No signif. difference						
Females more	**MIDDLE EAST** *Israel*: FD Horowitz 1977 (neonate) **NORTH AMERICA** *Canada*: Benenson et al. 1999 (neonate); *United States*: DF Freedman 1974:68 (neonate); Mahler et al. 1975 (mother-rated); Osofsky & O’Connell 1977 (neonate)					

8.2.8.5. Dancing

One study of dancing behavior in birds concluded that males exhibited the behavior to a greater extent than females (Table 8.2.8.5).

Table 8.2.8.5. Dancing.

Nature of Any Difference					Postpubertal	
						Adult
Males more						**BIRD** *Zebra Finch*: E Adkins-Regan et al. 1996
No signif. difference						
Females more						

8.2.8.6. Engaging in Artistic Activities in General

All of the available studies of sex differences in tendencies to engage in artistic activities have concluded that females do so more than males (Table 8.2.8.6).

Table 8.2.8.6. Engaging in artistic activities in general.

Nature of Any Difference	Prepuburtal	Postpubertal
	Early Childhood	Adolescent
Males more		
No signif. difference		
Females more	**NORTH AMERICA** *United States*: Krenzke 1981	**NORTH AMERICA** *United States*: Burks et al. 1930 (among gifted); Wijting et al. 1978; B Mannheim 1988

8.2.8.7. Genital Inspection/Contact

The extent to which individuals inspect or touch their own genitals has been investigated by a few studies of nonhumans and one study of young humans. In all cases, the conclusion has been that males are more prone to do so than females (Table 8.2.8.7).

Table 8.2.8.7. Genital inspection/contact.

Nature of Any Difference	Prepubertal		Multiple Age Categories
	Infant	Toddler	
Males inspected more	**PRIMATE (EXCEPT APE)** *Rhesus*: Goy et al. 1988 (neonate) **RODENT** *Rat*: Moore & Morelli 1979; Melniczek & Ward 1994	**NORTH AMERICA** *United States*: Hattwick 1937 (touching crotch)	**INTERNATIONAL** *Multiple Countries*: Rooth 1973 (40 Asian, African, & South American countries)
No signif. difference			
Females inspected more			

8.2.8.8. Having Hobbies/Collecting Behavior

The two studies of sex differences in collecting type hobbies both concluded that males are more likely to collect stamps while females are more likely to collect dolls (Table 8.2.8.8).

Table 8.2.8.8. Having hobbies/collecting behavior.

Nature of Any Difference	Prepubertal
	Childhood
Males more	**NORTH AMERICA** *United States*: Whitley 1929 (collect stamps); Witty & Lehman 1930 (collect stamps)
No signif. difference	
Females more	**NORTH AMERICA** *United States*: Whitley 1929 (collect dolls); Witty & Lehman 1930 (collect dolls)

8.2.8.9. Jaw Thrust Behavior

In pigtail monkeys, jaw thrusting seems to be a type of threat gesture. The one available study of a sex difference in this behavior concluded that it was more common among males than females (Table 8.2.8.9).

Table 8.2.8.9. Jaw thrust behavior.

Nature of Any Difference	Adolescent/Adult
	Adult
Males more	**PRIMATE (EXCEPT APE)** *Pigtail monkey*: SB Christopher & Gelini 1977
No signif. difference	
Females more	

8.2.8.10. Masturbation

Masturbation refers to engaging in self-stimulation of the genitals, often to the point of reaching orgasm. Nearly all studies have concluded that males are much more likely than females to masturbate, even among nonhuman animals (Table 8.2.8.10).

Table 8.2.8.10. Masturbation.

Nature of Any Difference	Prepubertal		Postpubertal		Multiple Age Categories
	Toddler	Childhood	Adolescent	Adult	
Males more	**NORTH AMERICA** *United States*: V Green 1985	**NORTH AMERICA** *United States*: Elias & Gebhard 1969	**ASIA** *India*: Tikoo 1997 **EUROPE** *Germany*: Sigusch & Schmidt 1973; *Sweden*: Lewin & Helmius 1983; Lewin & Helmius 1986 **NORTH AMERICA** *United States*: DG Brown & Lynn 1966; Hunt 1974*; Leitenberg et al. 1993*; DA Rosenthal & Smith 1997	**ASIA** *China*: Tang et al. 1997:87 (college); *Hong Kong*: DW Chan 1990 (young); *Japan*: Asayama 1975 **EUROPE** *Sweden*: Bergstrom-Walan & Nielson 1990 (elderly); Weinberg et al. 1995* (college) **LATIN AMERICA** *Columbia*: Alzate 1989 (young) **NORTH AMERICA** *Canada*: Meston et al. 1996 (young); *United States*: Kinsey et al. 1953*; Arafat & Cotton 1974* (college); WR Miller & Lief 1976 (college); Cowart & Pollack 1979 (young); Gebhard & Johnson 1979* (young); MD Story 1982 (young); Atwood & Gagnon 1987 (young); DeLamater 1987; JC Jones & Barlow 1990* (young); Leitenberg et al. 1993* (young); Laumann et al. 1994; Mosher & Maclan 1994:108 (college); Briton & Hall 1995; Weinberg et al. 1995* (college); Heaven & McBrayer 2000 (college); Chivers & Bailey 2005:116	**EUROPE** *Germany*: Clement et al. 1984:106; *Multiple Countries*: Sandfort et al. 1998:152 **NORTH AMERICA** *United States*: Kinsey et al. 1953*; Arafat & Cotton 1974*; M Hunt 1974*; Gebhard & Johnson 1979:261*; JC Jones & Barlow 1990*; Laumann et al. 1994:85* **FELINE** *Cat*: Rosenblatt & Schneirla 1962 **PRIMATE (EXCEPT APE)** *Rhesus Macaque*: Carpenter 1942; Nieuwenhuijsen et al. 1988c:369
No signif. difference				**NORTH AMERICA** *United States*: Heaven et al. 2002 (college)	
Females more					

8.2.8.11. Nail Biting

The two studies of sex differences in the tendency to bite one's finger nails reached contradictory conclusions (Table 8.2.8.11).

Table 8.2.8.11. Nail biting.

Nature of Any Difference	Preadolescent	Postpubertal
	Childhood	Adolescent
Males more		**NORTH AMERICA** *United States*: Wechsler 1931*
No signif. difference		
Females more	**NORTH AMERICA** *United States*: Wechsler 1931* (older)	

8.2.8.12. Neutering of Animals

One study found that females were more likely to seek veterinary assistance in neutering a dog or a cat pet, while another study found no gender difference (Table 8.2.8.12).

Table 8.2.8.12. Neutering of animals.

Nature of Any Difference	Postpubertal
	Adult
Males more	
No signif. difference	**LATIN AMERICA** *Bahamas*: Fielding et al. 2002
Females more	**OCEANIA** *Australia*: Blackshaw & Day 1994

8.2.8.13. Expansive Posture

While sitting or standing, some people tend to arrange their arms and legs in ways that occupy considerable adjacent space. They are said to have expansive posture. As shown in Table 8.2.8.13, the available research indicates that males exhibit more expansive posture than do females.

Table 8.2.8.13. Expansive posture.

Nature of Any Difference	Multiple Age Categories
Males more expansive	**NORTH AMERICA** *United States*: Collett & Marsh 1974; Aries 1982 (sitting); Cashdan 1998 (standing) **INTERNATIONAL** *Multiple Societies*: Hewes 1957 (sitting)
No signif. difference	
Females more expansive	

8.2.8.14. Seating Arrangement in Taxi

A few studies have sought to determine if a sex difference exists in people's tendencies to occupy the front or back seats of taxi cabs. These studies have determined that males passengers are more likely to ride in the front seat than are female passengers (Table 8.2.8.14).

Table 8.2.8.14. Seating arrangement in taxi.

Nature of Any Difference							Multiple Age Categories
Males more often in front							**OCEANIA** *Australia*: JS Watson & Kearins 1988; Kenner & Katsimaglis 1993
No signif. difference							
Females more often in front							

8.2.8.15. Singing

According to two studies, singing was more common in male canaries than in female canaries (Table 8.2.8.15).

Table 8.2.8.15. Singing.

Nature of Any Difference							Multiple Age Categories
Males more							**BIRD** *Canary*: Nottebohm & Arnold 1976; Nottebohm et al. 1976
No signif. difference							
Females more							

8.2.8.16. Sunbathing

One study that was found sought to determine which sex is most involved in sunbathing. It concluded that females do so more than males (Table 8.2.8.16).

Table 8.2.8.16. Sunbathing.

Nature of Any Difference					Postpubertal	
					Adolescent	Adult
Males more						
No signif. difference						
Females more						**NORTH AMERICA** *United States*: Koh et al 1997 (Whites)

8.2.8.17. Spending Time in the Sun

Even though females appear to sunbathe more than males (see preceding table), the available research has concluded that males spend more time in the sun than do females (Table 8.2.8.17), mainly as a result of engaging in more outdoors sporting and work activities.

Table 8.2.8.17. Spending time in the sun.

Nature of Any Difference						Postpubertal
						Adult
Males more						**NORTH AMERICA** *Canada*: SH Campbell & Birdsell 1994; *United States*: HI Hall et al. 1997 (Whites)
No signif. difference						
Females more						

8.2.8.18. Urination

The extent to which animals urinate under various conditions has been investigated by a few researchers. Whether such behavior constitutes a form of marking behavior or one of fearfulness (or possibly both) is uncertain. The findings in terms of any sex difference are somewhat mixed (Table 8.2.8.18).

Table 8.2.8.18. Urination.

Nature of Any Difference	Adolescent or Adult	Multiple Age Categories
	Adult	
Males more		**CANINE** *Dog*: CT Siwak et al. 2002* (in open field, ages1-3)
No signif. difference	**CANINE** *Dog*: CT Siwak et al. 2002* (in open field, ages 9 and up)	
Females more		

8.2.8.19. Body Posture During Urination

Among dogs, males have been found to urinate by raising one of their hind legs (while females are more inclined to squat) (Table 8.2.8.19).

Table 8.2.8.19. Body posture during urination.

Nature of Any Difference	Adolescent or Adult	Multiple Age Categories
	Adult	
Males lift leg rather than squat more	**CANINE** *Dog*: FA Beach 1974; E Ranson & Beach 1985	**CANINE** *Dog*: Beach 1975:12
No signif. difference		
Females lift leg rather than squat more		

8.2.8.20. Defecation

Numerous studies of defecating behavior by rodents have been conducted mainly because such behavior is considered an indicator of fearfulness. As shown in Table 8.2.8.20, these studies have been far from unanimous, bu largely suggest that males are more likely than females to defecate, especially when they enter an open unfamiliar environment.

Table 8.2.8.20. Defecation.

Nature of Any Difference	Prepubertal	Postpubertal
	Childhood	Adult
Males more		**RODENT** *Mouse*: ND Henderson 1967b (open field); P McReynolds et al. 1967 (open field); JH Bruell 1969 (due to fear of being in an open field); J Streng 1971 (in open filed); DA Blizard et al. 1975 (in open field); WW Beatty et al. 1976 (in open field); J Masur et al. 1980 (in open field); *Rat*: EE Anderson 1940 (open fields); Broadhurst 1957 (open fields); Broadhurst 1958 (open fields); Denenberg & Morton 1962 (open fields); CT Snowdon et al. 1964 (open field); JA Gray et al. 1965* (open fields); ND Henderson 1967a* (more in open field); D Lester 1968 (open field); Satinder 1968 (open field); Bruell 1969 (outbreed strains); JA Gray et al. 1969 (open fields); PA Russell 1971 (open field); GM Harrington 1972 (open field); H Imada 1972 (open field); J Masur 1972; K Vale 1972 (open field); DI Williams & Russell 1972 (open field); PA Russell 1973 (open field); JA Gray & Lalljee 1974 (open field)
No signif. difference	**RODENT** *Rat*: Quadagnoet al. 1972 (open field)	**RODENT** *Hamster*: HH Swanson 1966 (open field); *Mouse*: A Saylor & Salmon 1971*; *Rat*: S Levine & Broadhurst 1963 (open field); JA Gray et al. 1965* (inbreed strains); Manosevitz & Montemayor 1972* (open field); A Jolley & Dreesman 1973 (open field); Priestnall 1973 (open field); J Archer 1974* (Long-Evans Wistar strains, open field)
Females more		**RODENT** *Mouse*: ZM Nagy &Forrest 1970* (in open field); D Blizard 1971 (in open field); *Rat*: ND Henderson 1967a* (subjected to stress early in life, in open field); J Archer 1974* (Sprague-Dawley strain, open field)

8.2.9. Empirical Judgments/Predictions

Some studies have sought to determine if sex differences exist in the types of judgments people make about present, past, or future events. The results of these studies are summarized in the subsection below.

8.2.9.1. Accuracy in Assessing the Emotional Expressions of Others

Studies that have sought to determine which sex is most accurate in assessing the emotional expressions of others have all concluded that females surpass males in this ability (Table 8.2.9.1). This conclusion is consistent with a review of the literature conducted by JA Hall (1978).

Table 8.2.9.1. Accuracy in assessing the emotional expressions of others.

Nature of Any Difference	Prepubertal				Postpubertal		Multiple Age Categories
				Childhood		Adult	
Males more accurate							
No signif. difference						**EUROPE** *Britain*: Rahman et al. 2004* (facial expressions) **NORTH AMERICA** *United States*: JS Coleman 1949 (facial expressions of emotion)	
Females more accurate				**NORTH AMERICA** *United States*: Happe 1995 (children with autism); JT Spence & Buckner 2000:50 (self-rated)		**ASIA** *Japan*: Biehl et al. 1997* (facial expressions) **EUROPE** *Belgium*: Campanella et al. 2004 (happy faces); *Britain*: Ligge 1974 (facial expressions of emotion);Baron-Cohen et al. 1997 (adults with autism); Rahman et al. 2004* (a person's emotional state from facial expressions, accuracy of male faces); *Germany*: Schirmer & Kotz 2003 (a person's emotional state from speech inflections); *Norway*: Thayer & Johnsen 2000 (college); *Sweden*: Thayer & Johnsen 2000 (facial emotions) **NORTH AMERICA** *United States*: Jenness 1932 (facial expressions); S Weitz 1972; Cupchik 1973 (college, facial expressions of emotions); M Zuckerman et al. 1975 (facial expressions of emotion); M Zuckerman et al. 1976 (facial expressions of emotion); Hall 1978 (facial expression of emotion); R Rosenthal et al. 1979; Fujita et al. 1980; Natale et al. 1983 (photographs of faces); Heilbrun 1984 (non-verbal cues); Kombos & Fournet 1985 (young, non-verbal cues); Rotter & Rotter 1988 (young); LJ Simon et al. 1990 (young, non-verbal cues); Keeley-Dyreson et al. 1991 (non-verbal cues); Wagner et al. 1993 (young); Ambady et al. 1995 (non-verbal cues); Bouhuys et al. 1995 (schematic drawings of faces); Biehl et al. 1997* (facial expressions); Katsikitis et al. 1997 (college); JA Hall et al. 2000 (nonverbal cues); R Campbell et al. 2002 (facial emotions); Killgore & Cupp 2002 (videotaped faces); JA Hall & Matsumoto 2004 (college)	**NORTH AMERICA** *United States*: Firth et al. 1986 (non-verbal cues); HL Wagner et al. 1986 (non-verbal cues); Costanzo & Archer 1989 (non-verbal cues)

8.2.9.2. Perceptual Accuracy of Sex Determination

One study concluded that females were more accurate than males at identifying the sex of a partially incomplete facial image (Table 8.2.9.2).

Table 8.2.9.2. Perceptual accuracy of sex determination.

Nature of Any Difference					Postpubertal	
						Adult
Males more accurate						
No signif. difference						
Females more accurate						**EUROPE** *Britain*: Rahman et al. 2004 (determined by face)

8.2.9.3. Offspring's Expectations Regarding Parental Reactions to an Offspring's Emotional Behaviors

According to the available research, females expect to experience more negative (or less positive) outcomes from their behaving aggressively or expressing anger than do males (Table 8.2.9.3).

Table 8.2.9.3. Offspring's expectations regarding parental reactions to an offspring's emotional behaviors.

Nature of Any Difference	Prepubertal				Postpubertal	
				Childhood	Adolescent	Adult
Males expect more negative reactions						
No signif. difference						
Females expect more negative reactions				**NORTH AMERICA** *United States*: Fuchs & Thelen 1988 (from behaving aggressively)	**NORTH AMERICA** *United States*: Perry et al. 1989 (from behaving aggressively)	**EUROPE** *Britain*: A Campbell & Muncer 1987 (from expressing anger)

8.2.9.4. Accuracy of Physical Descriptions

One study concluded that males offered more accurate self-assessments of the extent to which they were or were not overweight (Table 8.2.9.4).

Table 8.2.9.4. Accuracy of physical descriptions.

Nature of Any Difference					Postpubertal	
						Adult
Males more						**NORTH AMERICA** *Germany*: Glaesmer & Brahler 2002 (self-report)
No signif. difference						
Females more						

8.2.9.5. Assessment of Driving Ability

According to one study, when compared to females, males rate their ability to drive after drinking as better (less impaired; Table 8.2.9.5).

Table 8.2.9.5. Assessment of driving ability.

Nature of Any Difference					Postpubertal		
						Adult	
Males self-rated better						**NORTH AMERICA** *Canada*: Svenson et al. 1994:399 (college, after drinking)	
No signif. difference							
Females self-rated better							

8.2.9.6. Estimating the Chances of Physical Injury (Risk Assessment)

Three studies suggested that females gave higher estimates than males did of the chances of being physically injured under a variety of circumstances (Table 8.2.9.6).

Table 8.2.9.6. Estimating the chances of physical injury (risk assessment).

Nature of Any Difference	Prepubertal						
				Childhood			
Males gave higher estimates							
No signif. difference							
Females gave higher estimates				**MIDDLE EAST** *Turkey*: Demirhan 2003 (various sports) **NORTH AMERICA** *Canada*: BA Morrongiello & Rennie 1998; BA Morrongiello et al. 2000			

8.2.9.7. Assessing the Attractiveness of Others

According to a couple of studies, the average ratings given by men to photographs of females were higher than the ratings given to those photographs by women judges (Table 8.2.9.7).

Table 8.2.9.7. Assessing the attractiveness of others.

Nature of Any Difference					Postpubertal		
						Adult	
Males more						**NORTH AMERICA** *United States*: Abbey 1982 (college, assessing females); Abbey et al. 1987 (college, assessing females)	
No signif. difference							
Females more							

8.2.9.8. Assessing Sexual Interest by Others

One study of sex differences in ratings of the degree to which women's expressions of friendliness revealed flirtation concluded that male judges are more likely than female judges to make such assessments (Table 8.2.9.8).

Table 8.2.9.8. Assessing sexual interest by others.

Nature of Any Difference					Postpubertal		
						Adult	
Males more						**NORTH AMERICA** *United States*: Abbey 1982 (college, interpret friendliness as flirtation)	
No signif. difference							
Females more							

8.2.9.9. Estimating Expected Salary

Studies have consistently shown that men anticipate earning more in their future or present jobs than do women (Table 8.2.9.9).

Table 8.2.9.9. Estimating expected salary.

Nature of Any Difference					Postpubertal	
						Adult
Males expect more						**NORTH AMERICA** *United States*: Callahan-Levy & Messe 1979; B Major & Konar 1984; B Major & Konar 1984; B Major et al. 1984; BA Martin 1989; LA Jackson et al. 1992; KE Sumner & Brown 1996:831 (college graduates)
No signif. difference						
Females expect more						

8.2.9.10. Expecting to Be the Object of Discrimination

One study of which sex was more likely to anticipate being the object of discrimination concluded that females surpassed males in this regard (Table 8.2.9.10).

Table 8.2.9.10. Expecting to be the object of discrimination.

Nature of Any Difference					Postpubertal	
						Adult
Males expect more						
No signif. difference						
Females expect more						**NORTH AMERICA** *United States*: Orazem et al. 2003 (young)

8.2.9.11. Time Estimations

The available research on sex differences in accuracy of time estimations has concluded that there are no significant differences (Table 8.2.9.11).

Table 8.2.9.11. Time estimations.

Nature of Any Difference					Postpubertal		Multiple Age Categories
						Adult	
Males more accurate							
No signif. difference						**NORTH AMERICA** *United States*: Block et al. 2000 (short time intervals)	**EUROPE** *Spain*: P Botella et al. 2001 (time interval between two stimuli); Esinosa-Fernandez et al. 2003 (short time intervals)
Females more accurate							

8.3
HEALTH-RELATED BEHAVIOR

Behavior can obviously affect health. Many studies sought to determine if males and females behave in ways that either promote or detract from their health. Findings are summarized below.

8.3.1. Behaving in Ways That Promote Health in General

Studies undertaken to determine which sex was most likely to behave in health-promoting ways are summarized below.

8.3.1.1. Taking Preventive Health Precautions/Health Maintenance in General

Taking preventive health precautions includes behavior such as regularly brushing one's teeth, fastening one's seat belt in moving vehicles, washing hands after using public restrooms, getting medical checkups periodically, and following the advice given by health care professionals. Studies of such behavior are usually based on self-reports, although some such as hand washing in restrooms has sometimes been inferred based on the use of soap dispensers or hand towels. As shown in Table 8.3.1.1, nearly all of the research concerning gender differences in tendencies to take preventive health precautions has concluded that females do so to a greater extent than males.

Table 8.3.1.1. Taking preventive health precautions/health maintenance in general.

Nature of Any Difference					Postpubertal		Multiple Age Categories
					Adolescent	Adult	
Males more							
No signif. difference					**EUROPE** *Finland*: Koivusilta et al. 2003 (brushing teeth) **OCEANIA** *Australia*: Balanda et al. 1999		
Females more					**NORTH AMERICA** *United States*: Brener & Collins 1998; Langhinrichsen-Rohling et al. 1998* (young)	**NORTH AMERICA** *United States*: E Beck et al. 1974 (follow medical advise); Hibbard 1983 (follow medical advise); Hickey et al. 1988 (elderly); KA Douglas et al. 1997 (college); Patrick et al. 1997 (college); Langhinrichsen-Rohling et al. 1998* (young); Courtenay et al. 2002* (college); HD Johnson et al. 2003 (college, restroom hand washing); Cleary et al. 2004:55	**EUROPE** *Austria*: Van de Mortel et al. 2000 (restroom hand washing) **NORTH AMERICA** *United States*: Schoenborn et al. 1981; Quadrel & Lau 1990; Kandrack et al. 1991; Carmel et al. 1992 (follow medical advise); Day et al. 1993 (using soap to wash hands); Cornel et al. 1994* (follow medical advise); Ingledew et al. 1995:18; Meyerowitz & Hart 1995; Guinan et al. 1997 (restroom hand washing); Courtenay et al. 2002* (college)

8.3.1.2. Physical Activity and Exercise

To assess people's varying degrees of physical activity or exercise, self-reports are used except in the case of young children where information is usually obtained from parents or teachers. In Table 8.3.1.2a, one can see that nearly all studies have concluded that prepubertal males engage in more physical activity than do their female counterparts.

Split-Table 8.3.1.2a. Physical activity and exercise, prepubertals.

Nature of Any Difference	Prepubertal					
	Infant	Toddler	Early Childhood	Childhood		
Males more	**NORTH AMERICA** *United States*: DW Campbell & Eaton 1999	**NORTH AMERICA** *United States*: Manwell & Mengert 1934; Maccoby & Jacklin 1973; Sallis et al. 1999	**NORTH AMERICA** *United States*: DM Buss et al. 1980; Sallis et al. 1993; Tonyan & Howes 2003:138 (teacher rating)	**ASIA** *Japan*: Takada et al. 1998; *Singapore*: GJ Schmidt et al. 1998 **EUROPE** *Belgium*: Guillaume et al. 1997; *Sweden*: Sunnegardh et al. 1985 **LATIN AMERICA** *Chile*: Olivares et al. 2004 **NORTH AMERICA** *Canada*: AM Thompson et al. 2003* (younger; controlled for peak height velocity); *United States*: Klesges et al. 1986; Baranowski et al. 1987; McKenzie et al. 1992; R Cohen et al. 1990*; Sallis et al. 1990*; Baranowski et al. 1993; Garcia et al. 1995; Janz et al. 1995; Durant et al. 1996; Hovell et al. 1996; Kemper et al. 1996; Saris et al. 1996; Trost et al. 1996; Pate et al. 1997; Trost et al. 1997 (rural); Corbin & Pangrazi 1998; Garcia et al. 1998; Goran et al. 1998; Ernst & Pangrazi 1999; Hovell et al. 1999		
No signif. difference			**NORTH AMERICA** *Canada*: WO Eaton & Keats 1982:537	**NORTH AMERICA** *United States*: JC Schwarz 1972; L Myers et al. 1996		
Females more						

Regarding adolescents and adults, Split-Table 8.3.1.2b shows that among humans, most studies have found males engaging in more physical activity and exercise than females. This appears to be the one type of health maintenance behavior that males exhibit to a greater degree than females. Interestingly, among rodents, females have been found to exercise more than males.

Split-Table 8.3.1.2b. Physical activity and exercise, postpubertals.

Nature of Any Difference					Postpubertal		Multiple Age Categories
					Adolescent	Adult	
Males more					**EUROPE** *Britain*: Armstrong et al. 1990; Steptoe & Butler 1996; *Finland*: Raitakari et al. 1994; *Germany*: Fuchs et al. 1988; *Iceland*: Vilhjalmsson & Kristjansdottir 2003; *Northern Ireland*: Riddoch et al. 1991; *Norway*: Tell & Veller 1988 **NORTH AMERICA** *Canada*: Rowland et al. 1986 (college, football as exercise); Allison & Adlaf 1997; Galambos et al. 2004:20; *United States*: Tryon 1939; Godin & Shephard 1984; Gottlieb & Chen 1985; Perry et al. 1985; Godin et al. 1986; Godin & Shephard 1986; Sallis et al. 1988 (Hispanics); KJ Ferguson et al. 1989; Perusse et al. 1989; R Cohen et al. 1990*; Sallis et al. 1990*; Sallis et al. 1992; Terre et al. 1992; G Heath et al. 1994; Kelder et al. 1994; Pate et al. 1994; WC Taylor et al. 1994; Zakarian et al. 1994; Epstein et al. 1995; Winnail et al. 1995; Lowry et al. 1996; Pate et al. 1996; Centers for Disease Control and Prevention 1997; Biddle et al. 1998; De Bourdeaudhuu 1998; Guinn et al. 2000 (Hispanic students)	**EUROPE** *Britain*: Marmot & Davey Smith 1997:table 2 **NORTH AMERICA** *Canada*: M Denton et al. 2004:2592; *United States*: Folsom et al. 1985 (leisure time physical activity); JM Hawkes & Holm 1993; Crespo et al. 1996 (leisure time); Koertge et al. 2003:1320 (CAD patients, hours/week); Buchowski et al. 2004; Cleary et al. 2004:56* (vigorous): Murtagh & Hubert 2004:1409 (elderly)	**EUROPE** *Italy*: Tenconi et al. 1992:767 **INTERNATIONAL** *Multiple Countries*: Eccles & Harold 1991; Pfister 1993; Fredricks & Eccles 2002; Hartmann-Tews & Pfister 2003
No signif. difference					**NORTH AMERICA** *Canada*: AM Thompson et al. 2003* (older, controlled for peak height velocity)	**NORTH AMERICA** *United States*: Cleary et al. 2004:56* (moderate):	
Females more						**RODENT** *Mouse*: Wiedmer et al. 2004:2861	**RODENT** *Rat*: Hitchcock 1925 (running wheel activity)

8.3.1.3. Improvement of Physical Functioning Due to Exercise

In a few studies of elderly persons, data have been collected to assess how much physical functioning is promoted through exercise. Two of these studies concluded that there was no significant sex difference in improvement, while the third asserted that females gained more than males did through exercise (Table 8.3.1.3).

Table 8.3.1.3. Improvement of physical functioning due to exercise.

Nature of Any Difference					Postpubertal
					Adult
Males more					
No signif. difference					**MIDDLE EAST** *Israel*: Carmeli et al. 2000 (elderly, latency improvement, after 12 weeks) **NORTH AMERICA** *United States*: Strawbidge et al. 1993 (elderly)
Females more					**NORTH AMERICA** *United States*: Morey & Zhu 2003 (elderly)

8.3.1.4. Wearing Seatbelts

Several studies have been undertaken to assess sex differences in the frequency of seatbelt wearing while driving or riding in a car, most of which have been based on self-reports. Most of these studies have concluded that females are more likely to wear their seatbelts than males (Table 8.3.1.4).

Table 8.3.1.4. Wearing seatbelts.

Nature of Any Difference					Postpubertal		Multiple Age Categories
					Adolescent	Adult	
Males more							**MIDDLE EAST** *Iran*: Roudsari et al. 2004 **NORTH AMERICA** *United States*: FM Council 1969; TE Anderson 1971
No signif. difference					**NORTH AMERICA** *United States*: Schnichor et al. 1990; Shin et al. 1999:490		
Females more						**NORTH AMERICA** *United States*: GB West et al. 1996 (college)	**NORTH AMERICA** *Canada*: RJ Wilson 1990 (self-report); *United States*: AF Williams 1972; Fhaner & Hane 1973; Helsing & Comstock 1977; EK Lund 1986; Wagenaar et al. 1987; Preusser et al. 1991; Shinar 1993; Reinfurt et al. 1994; Baguley et al. 1996; DE Nelson et al. 1998:246

8.3.1.5. Using Sunscreen When Sunbathing

All of the available evidence indicates that females are more likely to use sunscreen when sunbathing than are males when doing so (Table 8.3.1.5).

Table 8.3.1.5. Using sunscreen when sunbathing.

Nature of Any Difference				Postpubertal	
					Adult
Males more					
No signif. difference					
Females more				**NORTH AMERICA** *United States*: JK Robinson et al. 1997	**NORTH AMERICA** *Canada*: SH Campbell & Birdsell 1994; *United States*: D Hill et al. 1984; Keesling & Friedman 1987; Berwick et al. 1992; Carmel et al. 1994* (skin cancer prevention); HI Hall et al. 1997 (Whites); Koh et al. 1997 (Whites); Abroms et al. 2003 **OCEANIA** *Hawaii*: PH King et al. 1983

8.3.2. Food Related Health-Promoting Behavior

The following subsection summarizes findings that have attempted to compare the healthiness of male and female eating habits.

8.3.2.1. Eating Healthy Foods

The extent to which people eat healthy foods, such as fruits and vegetables, is scientifically assessed among adolescents and adults on the basis of self-reports. Table 8.3.2.1 shows that females report eating healthy foods to a greater extent than do males.

Table 8.3.2.1. Eating healthy foods.

Nature of Any Difference	Prepubertal			Postpubertal		Multiple Age Categories
			Early Childhood	Adolescent	Adult	
Males do so more						
No signif. difference			**EUROPE** *Britain*: JR Gregory et al. 1995		**UNGULATE** *Mouflon*: Cransac et al. 1997; *Mule Deer*: Bowyer 1984; *Red Deer*: Bruinderink & Hazebroek 1995; *White-Taled Deer*: Weckerly & Nelson 1990	
Females do so more				**NORTH AMERICA** *United States*: Perry et al. 1985; Striegel-Moore & Rodin 1985; R Cohen et al. 1990; Neumark-Sztainer et al. 1998; KD Reynolds et al. 1999	**UNGULATE** *Chamois*: Perez-Barberia et al. 1997; *Mule Deer*: Main & Coblentz 1996; *Red Deer*: Staines & Crisp 1978; Staines et al. 1982 (winter eating)	**EUROPE** *Britain*: Marmot & Davey Smith 1997*:table 2 (fresh fruits); Wardle et al. 2000; AH Baker & Wardle 2003:272 **NORTH AMERICA** *United States*: Food Marketing Institute 1990; AM Smith & Smith 1994 (fruit and vegetables); Nayga 1997; Marmot & Davey Smith 1997*:table 2 (fresh fruits); RL Thompson et al. 1999

8.3.2.2. Dieting (Making an Effort to Lose/Not Gain Weight)

Studies of efforts to lose weight (or to maintain it at a level that is below some previously undesirably high level) are largely based on self-reports. Table 8.3.2.2 shows that all of the available studies of gender differences have concluded that females diet more than do males.

Table 8.3.2.2. Dieting (making an effort to lose/not gain weight).

Nature of Any Difference	Prepubertal				Postpubertal		Multiple Age Categories
				Childhood	Adolescent	Adult	
Males do so more							
No signif. difference							
Females do so more				**EUROPE** *Britain*: EM White et al. 1995 **NORTH AMERICA** *United States*: AE Field et al. 2001*; V Phares et al. 2004 (SE region of US)	**EUROPE** *Germany*: Hein et al. 1998; *Spain*: Sanchez-Carracedo et al. 1996; *Sweden*: Engstrom & Norring 2002; Thurfjell et al. 2004 **NORTH AMERICA** *United States*: A Frazier & Lesonbee 1950 (want/tried to lose weight); Huenemann et al. 1966; RG Simmons & Rosenberg 1975 (preferenc for being thin); RS George & Krondl 1983 (preference for being thin); Tobin-Richards et al. 1983 (preference for being thin); Dornbusch et al. 1987; Shore & Porter 1990; DC Moore 1993; SA French et al. 1995; GC Patton et al. 1997; Pingitore et al. 1997; ME Pritchard et al. 1997; AE Field et al. 2001*; DT Barry & Grilo 2002:339	**EUROPE** *Norway*: Kjelsas & Augestad 2003 (marathon runners, control weight); *Several European Countries*: Bellisle et al. 1995 **NORTH AMERICA** *Canada*: Provencher et al. 2004; *United States*: Jakobovits et al. 1977 (young); TM Miller et al. 1980 (young); RW Jeffery et al. 1984; RW Jeffery et al. 1991; SG Ziegler 1991 (marathon runners, control weight); DF Williamson et al. 1992; Carmody et al. 1995; Beren et al. 1996; Neumark-Sztainer et al. 1999; Serdula et al. 1999; Kabeer et al. 2001:130; Koertge et al. 2003:1320 (CAD patients, % of total calories from fat) **OCEANIA** *Australia*: DA Crawford & Worsley 1988	**EUROPE** *Sweden*: Halvarsson et al. 2002 **NORTH AMERICA** *United States*: Dwyer & Mayer 1970; Serdula et al. 1993

8.3.2.3. Success at Weight Loss

Findings have not been consistent regarding which sex has been most successful at losing weight, although most studies suggest that females are more successful than males (Table 8.3.2.3).

Table 8.3.2.3. Success at weight loss.

Nature of Any Difference					Postpubertal		Multiple Age Categories
						Adult	
Males more						**NORTH AMERICA** *United States*: Assaf et al. 2003 (among the over-weight, 8 year follow up)	
No signif. difference						**NORTH AMERICA** *United States*: Dohm et al. 2001 (among the over-weight, 8 year follow up)	
Females more						**EUROPE** *Finland*: Keski-Rahkonen et al. 2005 **NORTH AMERICA** *United States*: Meltzer & Everhart 1995; Neumark-Sztainer et al. 1999 (intentionally lose weight)	**NORTH AMERICA** *United States*: Neumark-Sztainer et al. 2000 (intentionally lose weight); AE Field et al. 2003 (intentionally lose weight)

Chapter 9
SOCIAL BEHAVIOR

Social behavior refers to behavior in which an individual's actions are being altered by one or more other individuals (typically of the same species). Traditionally, social behavior could only occur when the social interactants were in close proximity to one another, but with modern communication devices, some social behavior among humans can occur over vast distances. This chapter reviews a wide array of social behavior for which gender differences have been investigated.

9.1
BROAD-RANGING ASPECTS OF SOCIAL BEHAVIOR

Social behavior in its most general sense pertains to the amount of time individuals spend in one another's company.

9.1.1. Social Orientation and Friendships

The results of studies on gender differences in a variety of social circumstances are summarized below.

9.1.1.1. Overall Social Competence

In a couple of studies, the sexes were rated by adults in terms of their basic social competency. As shown in Table 9.1.1.1, these studies both concluded that females surpass males in the ratings they received.

Table 9.1.1.1. Overall social competence.

Nature of Any Difference	Prepubertal					
				Childhood		
Males more						
No signif. difference						
Females more				**NORTH AMERICA** *United States*: Eisenberg et al. 1999; Arsenio et al. 2001		

9.1.1.2. Time Spent in the Company of Others (Social Orientation in General)

The few studies that have examined gender differences in time spent with others (as opposed to being alone, or possibly with animals other than humans) have largely concluded that females spend a greater proportion of their time in the company of others than is the case for males (Table 9.1.1.2). The one study that qualified this conclusion found no significant gender difference among school age children but did find a difference among adolescents.

Table 9.1.1.2. Time spent in the company of others (social orientation in general).

Nature of Any Difference	Prepubertal		Postpubertal	
	Infant	Childhood	Adolescent	Adult
Males more				
No signif. difference	**NORTH AMERICA** *United States*: Maccoby & Jacklin 1973 (with an adult)	**NORTH AMERICA** *United States*: R Carlson 1965*		
Females more	**NORTH AMERICA** *United States*: S Goldberg & Lewis 1969 (with an adult)	**NORTH AMERICA** *United States*: Bonney 1942; Bonney 1944 **PRIMATE (EXCEPT APE)** *Hanuman Langur*: Nikolei & Borries 1997 (companies of the same-sex)	**NORTH AMERICA** *United States*: Lund 1944; R Carlson 1965*; Kashani et al. 1987; Koestner & Aube 1995	**NORTH AMERICA** *United States*: Cohler & Lieberman 1980 (elderly); Troisi & Moles 1999 (depressed persons)

9.1.1.3. Number of Friends in General

Studies of gender differences in the number of friends one has have reached inconsistent conclusions (Table 9.1.1.3).

Table 9.1.1.3. Number of friends in general.

Nature of Any Difference	Prepubertal	Postpubertal	
	Childhood	Adolescent	Adult
Males have more	**NORTH AMERICA** *United States*: Wellman 1926 (seek a wider network of social relationships); HM Campbell 1939 (seek a wider network of social relationships)	**NORTH AMERICA** *United States*: Seiffge-Krenke 1995	**EUROPE** *Britain*: Fuhrer et al. 1999 (civil servants, broader social network range)
No signif. difference			**EUROPE** *Germany*: J Smith & Baltes 1998 **NORTH AMERICA** *United States*: A Booth 1972:185
Females have more	**NORTH AMERICA** *United States*: Waldrop & Halmerson 1975 (intimate)	**EUROPE** *Germany*: Kirkcaldy et al. 2003:54 (close friends) **NORTH AMERICA** *United States*: Burks et al. 1930 (intimate friendships, high IQ subjects)	**ASIA** *Japan*: Igarashi et al. 2005 **NORTH AMERICA** *United States*: Wright 1989 (elderly); G Moore 1990; Ashton & Fuehrer 1993 (larger network of social support); Frydenberg & Lewis 1993 (larger network of social support); K Walker 1994

9.1.1.4. Abundance of Same-Sex (vs. Opposite-Sex) Social Interactions

In Table 9.1.1.4, the focus is not on male-female differences per se, but on whether social interactions tend to occur amongst members of the same sex or the opposite sex. As one can see, all studies have concluded that same-sex social interactions are more common than opposite-sex social interactions.

Table 9.1.1.4. Abundance of same-sex (vs. opposite-sex) social interactions.

Nature of Any Difference	Prepubertal		Postpubertal
	Early Childhood	Childhood	Adolescent
More same-sex interactions	**AFRICA** *South Africa*: Blurton et al. 1973 (!Kung) **NORTH AMERICA** *United States*: Draper 1975; LaFreniere et al. 1984; Roopnarine 1984 **PRIMATE (EXCEPT APE)** *Rhesus Macaque*: IS Bernstein et al. 1993	**NORTH AMERICA** *United States*: Whiting & Edwards 1973; S Ellis et al. 1981	**NORTH AMERICA** *United States*: ML Clark & Ayers 1992; Bukowski et al. 1993
No signif. difference			
More opposite sex interactions			

9.1.1.5. Number of Friends of the Same-Sex

Research findings have been inconsistent with respect to reporting any male/female differences in having same-sex friendships (Table 9.1.1.5).

Table 9.1.1.5. Number of friends of the same-sex.

Nature of Any Difference	Prepubertal	
	Infant	Early Childhood
Males more	**PRIMATE (EXCEPT APE)** *Rhesus Macaque*: GC Ruppenthal et al. 1974	**NORTH AMERICA** *United States*: Challman 1933 (playmates); LK Koch 1933 (playmates); Parten 1933 (playmates)
No signif. difference		**NORTH AMERICA** *United States*: Montemayer & Van Komen 1985; Benenson 1990; Urberg et al. 1995
Females more	**PRIMATE (EXCEPT APE)** *Rhesus Macaque*: Suomi et al. 1970 (same-sex friendships earlier)	**NORTH AMERICA** *United States*: Pitcher & Schultz 1983:21

9.1.1.6. Number of Friends of the Opposite Sex

Studies have reached inconsistent conclusions regarding any sex difference regarding the number of friends one has of the opposite sex (Table 9.1.1.6).

Table 9.1.1.6. Number of friends of the opposite sex.

Nature of Any Difference	Postpubertal
	Adult
Males more	**NORTH AMERICA** *United States*: A Booth 1972:186; Reis et al. 1985 (college, involved in intimate social opposite-sex interactions); Reis et al. 1986 (college, involved in intimate social opposite-sex interactions); L Rubin 1985; R Buhrke & Fuqua 1987 HM Reeder 2003 (college)
No signif. difference	**NORTH AMERICA** *United States*: A Boothe & Hess 1974
Females more	**NORTH AMERICA** *United States*: Wheeler & Nezlik 1977 (college, more involved in intimate social opposite-sex interactions); S Parker & deVries 1993 (self-report)

9.1.1.7. Considering Kin to Be One's Closest Friends

When asked to name their closest friend(s), females have been found to be more likely than males to identify a member of their family (Table 9.1.1.7).

Table 9.1.1.7. Considering kin to be one's closest friends.

Nature of Any Difference	Multiple Age Categories
Males more	
No signif. difference	
Females more	**NORTH AMERICA** *United States*: Fischer & Oliker 1983; PV Marsden 1987; KE Campbell 1988

9.1.1.8. Complexity of Same-Sex Friendships in General

Using self-reports, several studies have sought to determine if there are gender differences in same-sex friendships. These studies have concluded that females have more complex and multifaceted friendships than is true for males. In other words, the friendships among males tend to be more narrowly focused on one or a few activities than is true for friendships among females (Table 9.1.1.8).

Table 9.1.1.8. Complexity of same-sex friendships in general.

Nature of Any Difference	Prepubertal	Postpubertal	
	Childhood		Adult
More among males			
No signif. difference			
More among females	**NORTH AMERICA** *United States*: Waldrop & Halverson 1975	**NORTH AMERICA** *United States*: A Booth 1972	**NORTH AMERICA** *United States*: L Weiss & Lowenthal 1975 (college); JD Block 1980; Barth & Kinder 1988; Sapadin 1988 (college professors)

9.1.2. Compromising and Conforming Behavior

A great deal of research has been directed toward determining if males or females are more likely to alter their opinions or behavior in accordance with the opinions or behavior of others. Much of the research has been of an experimental nature in which research confederates will express a view that is contrary to reality in order to determine if subjects of one sex are more likely to alter their opinions of the confederates.

In reviews and meta-analyses of this research, conclusions about the overall patterns have varied from those who have suggested that no consistent gender differences exist (e.g., Maccoby & Jacklin 1974) to those who have maintained that females seem to be more likely to conform their expressed opinions than men, especially when they must do so publicly rather than privately (HM Cooper 1979). The latter conclusion has been refined even further by noting that females conform to group opinion particularly when the group members are known to have greater knowledge of a topic than the subject being tested (Eagly & Carli 1981).

9.1.2.1. Conformity in General

Several fairly general studies of conformity have been conducted, most of which have concluded that females are more likely to conform than males, although there may be racial variations in this regard (Table 9.1.2.1).

Table 9.1.2.1. Conformity in general.

Nature of Any Difference	Prepubertal				Postpubertal	
				Childhood	Adolescent	Adult
Males more					**NORTH AMERICA** *United States*: Iscoe et al. 1964* (Blacks)	**EUROPE** *Germany*: Bischop et al. 2000 (social pressure to drink)
No signif. difference				**NORTH AMERICA** *United States*: McConnell 1963* (erroneous suggestions)	**NORTH AMERICA** *United States*: McConnell 1963* (erroneous suggestions); FW Schneider 1970* (young, erroneous judgments, Blacks); Iscoe et al. 1963* (Whites, to others' reported perceptions)	
Females more				**NORTH AMERICA** *United States*: Tuddenham 1961 (erroneous judgments); Iscoe et al. 1963* (Whites, to others' reported perceptions)	**MIDDLE EAST** *Israel*: Hirschberger et al. 2002:131 (willingness to use drugs offered by a friend) **NORTH AMERICA** *United States*: Iscoe et al. 1964* (Whites); Carrigan & Julian 1966 (erroneous judgments); HI Walberg 1969	**NORTH AMERICA** *United States*: Crutchfield 1955 (college, Whites, opinions about perceptions); VL Allen & Crutchfield 1963 (college, experimental tasks); Reitan & Shave 1964 (college, Whites); FW Schneider 1970* (young, erroneous judgments, Whites)

9.1.2.2. Conformity to Empirical Judgments in the Presence of Others

Nearly all studies have concluded that there is either no gender difference in the tendency to conform one's judgments and opinions to those expressed by others or that females are more likely than males to conform (Table 9.1.2.2).

Table 9.1.2.2. Conformity in empirical judgments in the presence of others.

Nature of Any Difference	Prepubertal				Postpubertal	
				Childhood	Adolescent	Adult
Males more						**NORTH AMERICA** *United States*: Crutchfield 1955*; Kanareff & Lanzetta 1961 (young); Kilham & Mann 1974 (college)
No signif. difference				**NORTH AMERICA** *United States*: Costanzo & Shaw 1966	**NORTH AMERICA** *United States*: Costanzo & Shaw 1966; Jovick 1972; Landsbaum & Willis 1971; Wiesenthal et al. 1976	**ASIA** *Japan*: Frager 1970 **EUROPE** *Germany*: Timaeus 1968 **NORTH AMERICA** *United States*: Beloff 1958; Coleman et al. 1958; Tuddenham 1958b; Ex 1960; Kanareff & Lanzetta 1960b; Milgram 1963; Steiner & Rogers 1963; McDavid & Sistrunk 1964; Endler 1965; Sistrunk & McDavid 1965; Vidulich & Stabene 1965; Phelps & Meyer 1966; Vidulich & Bayley 1966; Endler & Hoy 1967; Myers & Arenson 1968; Allen & Levine 1969; Crano 1970; Glinskiet al 1970; Johnson & MacDonnell 1974; KH Smith 1970; Strickler et al. 1970; Willis & Willis 1970; Sistrunk 1971; Landsbaum & Willis 1971; Klein 1972 (elderly); Sistrunk et al. 1972; Milgram 1973; Stone 1973; Wiesenthal et al. 1973; Buby & Penner 1974; Bem & Lewis 1975; Breger & Ruiz 1966; Endler, Coward et al. 1975; Ross et al. 1976; Riess & Schlenker 1977 **OCEANIA** *Australia*: Delin & Poo-Kong 1974
Females more					**NORTH AMERICA** *Canada*: Endler et al. 1972	**NORTH AMERICA** *United States*: Crutchfield 1955*; Strodtbeck & Mann 1956 (jury); Nakamura 1958; Tuddenham 1958a; Tuddenham et al. 1958; DiVesta & Cox 1960; Kanareff & Lanzetta 1960a; Tuddenham 1961; Allen & Crutchfield 1963; Crowne & Liverant 1963; Reitan & Shaw 1964; E Hollander et al. 1965; MacBride & Tuddenham 1965; Whittaker 1965b; Endler 1966; Rotter 1967; Julian et al. 1968; Julian et al. 1969; Sheridan & King 1972; Geller et al. 1973; Larsen 1974; Endler et al. 1975; Rosenthal & Rosnow 1975 **OCEANIA** *Fiji*: Chandra 1973*; *New Zealand*: Vaughan & Taylor 1966; Chandra 1973*

9.1.2.3. Conformity to Empirical Judgments in the Absence of Others

As shown in Table 9.1.2.3, most studies of people's tendencies to conform their privately expressed opinions about empirical phenomena to resemble the opinions of others have concluded that there are no significant sex differences.

Table 9.1.2.3. Conformity to empirical judgments in the absence of others.

Nature of Any Difference	Prepubertal	Postpubertal	
	Childhood	Adolescent	Adult
Males more			**NORTH AMERICA** *United States*: Sampson & Hancock 1967
No signif. difference	**LATIN AMERICA** *Brazil*: Sistrunk et al. 1971* **NORTH AMERICA** *United States*: Sistrunk et al. 1971*	**LATIN AMERICA** *Brazil*: Sistrunk et al. 1971* **NORTH AMERICA** *United States*: Sistrunk et al. 1971*; Sistrunk & McDavid 1971*	**LATIN AMERICA** *Brazil*: Sistrunk & Clement 1970; Sistrunk et al. 1971* **NORTH AMERICA** *United States*: Wiener 1959; Madden 1960; Wyer 1966; Wyer 1967; Eagly 1969; Sistrunk 1969; Sistrunk & Clement 1970; Sistrunk et al. 1971; Sistrunk & McDavid 1971*; Adair 1972; Sistrunk 1972; Sistrunk 1973; Goldberg 1974; Goldberg 1975
Females more		**NORTH AMERICA** *United States*: Patel & Gordon 1960	**NORTH AMERICA** *United States*: King 1959

9.1.2.4. Sex-Role Conformity Resistance

Table 9.1.2.4 shows that three studies have concluded that males are more resistant than females to attempts by others to get them to conform their sex-role behavior to resemble that of the opposite-sex.

Table 9.1.2.4. Sex-role conformity resistance.

Nature of Any Difference	Prepubertal	Postpubertal
	Childhood	Adolescent
Males more resistant	**NORTH AMERICA** *United States*: Ashton 1983 (contra sex-role modeling resistance); PA Katz & Walsh 1991 (contra sex-role modeling resistance)	**NORTH AMERICA** *United States*: Durkin & Hutchins 1984 (contra sex-role modeling resistance)
No signif. difference		
Females more resistant		

9.1.2.5. Compromising Behavior

Various studies have sought to determine if sex is related to seeking compromises when someone's desires are in conflict with those of others. These studies have not reached consistent conclusions (Table 9.1.2.5).

Table 9.1.2.5. Compromising behavior.

Nature of Any Difference	Prepubertal	Postpubertal	
	Childhood	Adolescent	Adult
Males more		**NORTH AMERICA** *United States*: KA Black 2000:507; Lindman et al. 1997	
No signif. difference	**NORTH AMERICA** *United States*: Ballif-Spanvill et al. 2003* (among children not exposed to domestic violence)		**EUROPE** *Sweden*: Klinteberg et al. 1987:92 (young)
Females more	**NORTH AMERICA** *United States*: M Miller et al. 1986; MH Goodwin 1988; Ballif-Spanvill et al. 2003* (among children exposed to domestic violence); Holmes-Lonergan 2003		**NORTH AMERICA** *United States*: Reinisch & Sanders 1986 (college); Gladue 1991a (college); Gladue 1991b (college)

9.1.2.6. Using Competitive Strategies When Mediating Conflict

When attempting to mediate conflict between persons or groups, researchers have sometimes compared the methods used by men and women. According to most studies, males are more inclined to encourage the use of competitive (as opposed to compromising) strategies in settling disputes, although several studies also suggest that there is no significant sex difference in this regard (Table 9.1.2.6).

Table 9.1.2.6. Using competitive strategies when mediating conflict.

Nature of Any Difference					Postpubertal	
						Adult
Males more						**NORTH AMERICA** *United States*: LA Baxter & Shepherd 1978; Zammuto et al. 1979 (interpersonal conflict); DC Bell et al. 1982 (marital conflict); Putnam & Wilson 1982 (organizational conflict); Rahim 1983 (interpersonal conflict); Yelsma & Brown 1985 (interpersonal conflict); Ting-Toomey 1986 (inter-racial conflict); Rossi & Todd-Mancillas 1987 (interpersonal conflict)
No signif. difference						**NORTH AMERICA** *United States*: Kilmann & Thomas 1977; Renwick 1977 (interpersonal conflict); Sternberg & Soriano 1984 (interpersonal conflict); Temkin & Cummings 1986 (organizational conflict); Chusmir & Mills 1989 (interpersonal conflict); BM Gayle 1991 (work setting)
Females more						

9.1.2.7. Influencing Others

In a couple of studies, males were found to be better than females at influencing others (Table 9.1.2.7).

Table 9.1.2.7. Influencing others.

Nature of Any Difference	Prepubertal				Postpubertal	
				Childhood		Adult
Males more				**NORTH AMERICA** *Canada*: Serbin et al. 1984 (school age)		**NORTH AMERICA** *United States*: Carli 2001 (social influence)
No signif. difference						
Females more						

9.1.2.8. Influencing the Topics of Conversations

According to a couple of studies, males have more of an influence on the topics of conversation taken up in a group discussion than is true for females (Table 9.1.2.8).

Table 9.1.2.8. Influences on the topics of conversation.

Nature of Any Difference					Postpubertal	
						Adult
Males more						**NORTH AMERICA** *United States*: Fishman 1983; Spencer & Drass 1989
No signif. difference						
Females more						

9.1.3. Touching and Looking at Others

Research findings on sex differences in such social interactions as touching and looking at others are presented in the following tables.

9.1.3.1. Grooming (Delousing) Others

Most research on grooming has involved nonhuman species of primates, although a few studies of humans also have been reported. The majority of these studies have indicated that females are more likely than males to engage in grooming behavior (Table 9.1.3.1).

Table 9.1.3.1. Grooming (delousing) others.

Nature of Any Difference	Prepubertal				Postpubertal		Multiple Age Categories
			Early Childhood	Childhood	Adolescent	Adult	
Males more						**PRIMATE (EXCEPT APE)** *White-Handed Gibbon*: Palombit 1996* (groom females in heterosexual pairs)	
No signif. difference					**PRIMATE (EXCEPT APE)** *Rhesus Macaque*: Hinde & Spncer-Booth 1967	**PRIMATE (EXCEPT APE)** *Siamang*: Palombit 1996* (heterosexual pairs) **RODENT** *Rat*: JA Gray et al 1965	
Females more			**PRIMATE (EXCEPT APE)** *Rhesus Macaque*: J D Mitchell 1968 (holding and grooming infants)	**APE** *Gorilla*: A Meder 1990* (earlier onset, captivity) **PRIMATE (EXCEPT APE)** *Hanuman Langur*: Nikolei & Borries 1997; *Japanese Macaque*: Eaton et al. 1985; Eaton et al. 1986	**APE** *Gorilla*: A Meder 1990* (earlier onset, captivity) **PRIMATE (EXCEPT APE)** *Blue Monkeys*: M Cords 2000 (field); *Bonnet Macaque*: Simonds 1974; *Rhesus Macaque*: HF Harlow 1962; *Vervets*: Raleigh et al. 1979 **RODENT** *Rat*: Meaney & Stewart 1981a	**PRIMATE (EXCEPT APE)** *Assamese Macaque*: MA Cooper & Bernstein 2000 (captivity) **UNGULATE** *Impala*: MS Mooring & Hart 1995 (breeding season, field)	**AFRICA** *South Africa*: Sugawara 1984 (Kung tribe); Sugawara 1990 **EUROPE** *France*: Le Roy Ladurie 1978 **PRIMATE (EXCEPT APE)** *Baboon*: Rowell 1972:43; *Rhesus Macaque*: Nieuwenhuijsen et al. 1988:362

9.1.3.2. Same-Sex Touching

A couple of studies of same-sex touching both concluded that this is done more often by females than by males (Table 9.1.3.2).

Table 9.1.3.2. Same-sex touching.

Nature of Any Difference	Prepubertal						Multiple Age Categories
			Early Childhood				
Males more							
No signif. difference							
Females more			**NORTH AMERICA** *United States*: VS Clay 1968				**NORTH AMERICA** *United States*: SE Jones & Yarbrough 1985

9.1.3.3. Opposite-Sex Touching

Touching of the opposite sex has been shown in most studies to be more common by males toward females than by females toward males (Table 9.1.3.3).

Table 9.1.3.3. Opposite-sex touching.

Nature of Any Difference					Postpubertal		Multiple Age Categories
					Adolescent	Adult	
Males more					**NORTH AMERICA** *United States*: FN Willis et al. 1976 (indoor)	**NORTH AMERICA** *United States*: Henley 1973 (outdoor)	**NORTH AMERICA** *United States*: Henley 1973 (in public); FN Willis et al. 1978 (indoor); B Major et al. 1990* (in public); Guerrera & Andersen 1994 (individuals in a romantic relationship) **INTERNATIONAL** *Multiple Western Countries*: Di Biase & Gunnoe 2004
No signif. difference							
Females more							**NORTH AMERICA** *United States*; Stier & Hall 1984 (in private); JA Hall & Veccia 1990; B Major et al. 1990* (in intimate settings)

9.1.3.4. Establishing/Maintaining Eye Contact in Social Interactions in General

Eye contact during social interactions is usually assessed by direct observation by a researcher either as events unfold or via videotaping the events. According to Table 9.1.3.4, females maintain greater eye contact with others during social interactions than do males.

Table 9.1.3.4. Establishing/maintaining eye contact in social interactions in general.

Nature of Any Difference	Prepubertal		Postpubertal
		Toddler	Adult
Males more			
No signif. difference			
Females more	**EUROPE** *Britain*: Lutchmaya et al. 2002a (with care giver/mother)	**EUROPE** *Britain*: Lutchmaya et al. 2002 (with adults) **NORTH AMERICA** *United States*: Podrouzek & Furrow 1988 (with adults)	**NORTH AMERICA** *United States*: Exline 1963 (young); Exline et al. 1965 (young); Rubin 1970 (college); Exline 1972 (young); SJ Frances 1979; WL Libby 1990 (young); JA Hall & Freidman 1999:1088 (college)

9.1.3.5. Making Eye Contact With Members of the Opposite-Sex

Making eye contact specifically with a member of the opposite-sex fairly often has flirtatious or sexual overtones. Table 9.1.3.5 shows that during adolescents, males appear to make eye contact with the opposite-sex more often, whereas in other age groups, female appear to do so.

Table 9.1.3.5. Making eye contact with members of the opposite-sex.

Nature of Any Difference		Postpubertal		Multiple Age Categories
	Early Childhood	Adolescent	Adult	
More in males		**EUROPE** *Germany*: Bente et al. 1998:45 **NORTH AMERICA** *United States*: TA Lamb 1981 (initial interaction)		
No signif. difference				
More in females	**NORTH AMERICA** *United States*: Hold 1976		**NORTH AMERICA** *United States*: JA Hall 1985 (college); JA Hall & Halberstadt 1986 (college); SJ Francis 1979 (young)	**NORTH AMERICA** *United States*: Dovidio et al. 1988a; Dovidio et al. 1988b; Ellyson 1992

9.1.4. Social Contact Within the Family

Sex differences in social contacts within the family have been investigated by several studies. The results are presented in the following tables.

9.1.4.1. Social Relationships Between Spouses

According to a couple of studies, females do more to actively maintain positive marital relationships than do their spouses (Table 9.1.4.1).

Table 9.1.4.1. Social relationship between spouses.

Nature of Any Difference	Postpubertal
	Adult
Males more likely	
No signif. difference	
Females more likely	**NORTH AMERICA** *United States*: Acitelli 1992; Kirkpatrick & Davis 1994

9.1.4.2. Withdrawal From Marital Conflict

Studies of couples who experience chronic marital conflicts have concluded that husbands are more likely (or earlier) to withdraw from these conflicts than are wives (Table 9.1.4.2).

Table 9.1.4.2. Withdrawal from marital conflict.

Nature of Any Difference	Postpubertal
	Adult
Males more likely	**NORTH AMERICA** *United States*: A Christiansen 1987; A Christensen & Shenk 1991; Heavey et al. 1993; Heavey et al. 1995
No signif. difference	
Females more likely	

9.1.4.3. Negative Reactions to Parental Breakup and Being Raised in a Single-Parent Household

A few studies have sought to determine if one sex is more likely than the other sex to exhibit overtly negative reactions to the breakup of their parents or to being raised in a single-parent household. As concluded also in a review by Seltzer (1994), all studies suggest that boys exhibit more negative outcomes than do girls (Table 9.1.4.3).

Table 9.1.4.3. Negative reactions to parental breakup and being raised in a single-parent household.

Nature of Any Difference			Postpubertal
	Early Childhood	Childhood	Adolescent
Males more	**NORTH AMERICA** *United States*: DR Morrison & Cherlin 1995	**NORTH AMERICA** *United States*: EM Hetherington et al. 1985	**ASIA** *Singapore*: Ang & Ooi 2004 (suicide ideation) **NORTH AMERICA** *United States*: JL Peterson & Zill 1986 (externalizing behavior & depression)
No signif. difference			
Females more			

9.1.4.4. Social Relationship Between Parents and Offspring

One study of the social relationships between parents and offspring concluded that female parents and offspring engage in more active social relationships than do their male counterparts (Table 9.1.4.4).

Table 9.1.4.4. Social relationships between parents and offspring.

Nature of Any Difference	Prepubertal	Postpubertal
	Infan(Offspring)	Adolescent (Offspring)
Males more		
No signif. difference		
Females more	**NORTH AMERICA** *United States*: Gunnar & Donahue 1980 (initiation of contact)	**EUROPE** *Czechoslovakia*: Jurovsky 1948

9.1.4.5. Family Conflict-Problems

Research concerning parent-child conflict has been limited to the mother. As shown in Table 9.1.4.5, these studies have revealed that conflict between mothers and their children have been greater in the case of female offspring than male offspring.

Table 9.1.4.5. Family conflict-problems.

Nature of Any Difference	Postpubertal
	Adolescent
Males more	
No signif. difference	
Females more	**EUROPE** *Germany*: Seiffge-Krenke 1999 (offspring-mothers) **NORTH AMERICA** *United States*: JP Hill & Holmbeck 1987 (offspring-mothers); Papini & Sebby 1988 (offspring-mothers); WA Collins 1990 (offspring-mothers); KT Brady et al. 1993 (substance abusers, family); LS Brown et al. 1993 (heroin addicts, family); RD Weiss et al. 1997 (cocaine addicts, family); Chatham et al. 1999 (heroin addicts, family); Liu 2004 (offspring-parents)

9.1.4.6. Dominance/Leadership in Family Decision-Making

A few studies have sought to determine whether one gender generally exercises dominance or leadership within an intact family. All have concluded that males are more likely than females to be considered dominant or to exercise greater leadership in family decision making than females (Table 9.1.4.6).

Table 9.1.4.6. Dominance/leadership in family decision-making.

Nature of Any Difference						Multiple Age Categories
More by males						**MIDDLE EAST** *Iran*: Azari 1983; Fathi 1985 **NORTH AMERICA** *United States*: O Brim et al. 1963; Stuchert 1963 **INTERNATIONAL** *Islamic Countries*: Kazemi 2000
No signif. difference						
More by females						

9.1.4.7. Relocating With One's Spouse to a New Job

One study found that married couples were more likely to move to a new city if the man was offered a job there than if the woman was offered such a job (Table 9.1.4.7).

Table 9.1.4.7. Relocating with one's spouse to a new job.

Nature of Any Difference						Multiple Age Categories
Males more often						
No signif. difference						
Females more often						**NORTH AMERICA** *United States*: Smits et al. 2003

9.1.4.8. Providing Nurturing Behavior to Infants in General

Numerous studies have sought to determine if gender differences exist in tendencies to behave in nurturing ways toward infants. Regarding subadolescents, Split-Table 9.1.4.8a shows that in the majority of studies, females are more likely to exhibit such behavior than males. Interestingly, this sex difference has even been found in a few species of nonhuman primates.

Split-Table 9.1.4.8a. Providing nurturing behavior toward infants by prepubertals.

Nature of Any Difference	Prepubertal					
			Early Childhood	Childhood		
Males more						
No signif. difference			**NORTH AMERICA** *United States*: Berman et al. 1979	**NORTH AMERICA** *United States*: Feldman et al. 1977; Frodi & Lamb 1978		
Females more			**NORTH AMERICA** *United States*: HA Moss 1967 (mothers held male infants longer); Whitting & Whitting 1975; PW Berman et al. 1977; Berman et al. 1977; Lamb 1978a; Lamb 1978b; Melson & Fogel 1982; RB Stewart 1983; Trotman Reid et al. 1989 **PRIMATE (EXCEPT APE)** *Rhesus Macaque*: J D Mitchell 1968 (holding and grooming infants)	**ASIA** *Japan*: Whiting & Whiting 1975* **AFRICA** *Kenya*: Whiting & Whiting 1975; Konner 1975* (!Kung tribe) **LATIN AMERICA** *Mexico*: Whiting & Whiting 1975* **NORTH AMERICA** *United States*: Whiting & Whiting 1975*; Fullard & Reiling 1976; PW Berman et al. 1977; Berman et al. 1978; Frodi & Lamb 1978; PW Berman et al. 1983*; PW Berman & Goodman 1984; Blakemore 1990; Blakemore 1998; Leveroni & Berenbaun 1998 **OCEANIA** *Philippines*: Whiting & Whiting 1975* **PRIMATE (EXCEPT APE)** *Rhesus Macaque*: Chamove et al. 1967		

Turning to adolescents and adults, most studies have found females exhibiting more nurturing behavior toward infants, although several studies failed to find a significant difference, and a few other studies actually found the opposite pattern (Split-Table 9.1.4.8b). As with prepubertals, a few studies of nonhuman primates suggest that females exhibit more nurturing toward infants (other than their own) than do males, a phenomenon sometimes called "aunting." Among rodents, however, the evidence suggests somewhat different patterns depending on the age of the recipient "infant."

Split-Table 9.1.4.8b. Providing nurturing behavior toward infants by postpubertals.

Nature of Any Difference					Postpubertal	
					Adolescent	Adult
Males more						**NORTH AMERICA** *United States*: Sternglanzet al. 1977* (young)
No signif. difference					**NORTH AMERICA** *United States*: Frodi & Lamb 1978	**OCEANIA** *Australia*: Murray 1978* (young) **NORTH AMERICA** *United States*: Parke et al. 1972; Bem et al. 1976* (young); Meehan & Gottfried 1976; Feldman & Nash 1978* (young); Feldman & Nash 1979a* (young) **RODENT** *Rat*: DE Ganzalez & Deis 1990* (maternal behavior in response to pups 3-4 months of age)
Females more					**NORTH AMERICA** *United States*: Fullard & Reiling 1976; Feldman et al. 1977; Berman et al. 1978; Frodi & Lamb 1978; Feldman & Nash 1979a; Blakemore 1981*; PW Berman et al. 1983*; Blakemore 1990; Blakemore 1991 **PRIMATE (EXCEPT APE)** *Multiple Species*: Maestripieri 1994	**EUROPE** *Sweden*: Lamb et al 1982 (parents); Lamb et al. 1983 (parents) **NORTH AMERICA** *United States*: Cann 1953* (young); Beier et al. 1957* (young); Hess & Polt 1960; Parke et al. 1972; Seavyet al. 1975; Berman 1976* (young); Fullard & Reiling 1976; Meeham & Gottfried 1976; Frisch 1977*; Rheingold & Joseph 1977* (young); Feldman & Nash 1978* (young); Frodi et al. 1978; Hildebrandt & Fitzgerald 1978* (young); Zeskind & Lester 1978* (young); Feldman & Nash 1979b* (elderly); Blakemore 1981*; Blakemore 1998; Blakemore 1990 **OCEANIA** *Australia*: Murray 1978 **PRIMATE (EXCEPT APE)** *Baboon*: Ehrhardt 1973; *Langur*: Gartlan & Brain 1968 **RODENT** *Rat*: DE Ganzalez & Deis 1990* (old rat in response to pups 20 months of age)

9.1.4.9. Providing Transport to Infants

Primatologists have maintained records on various species regarding which gender most often provides transportation for infants as the adolescents and adults forage for food. Among the relatively few species of monkeys who fairly often mate monogamously, males transport infants more often than do females (Table 9.1.4.9).

Table 9.1.4.9. Providing transport to infants.

Nature of Any Difference							Multiple Age Categories
Males more							**PRIMATE (EXCEPT APE)** *Titi Monkey*: Mason 1986; Meritt 1980; Fragaszyet al. 1982; PC Wright 1984; Mendoza & Mason 1986; *Owl Monkey*: AF Dixon 1983; *Tamarin Monkey*: Epple & Katz 1983
No signif. difference							
Females more							

9.1.4.10. Caring for One's Own Offspring/Parenting Activities

Table 9.1.4.10 indicates that in all human cultures and in nearly all other species (with the main exceptions being found in a few species of birds), females are more likely than males to be the primary caregivers to their genetic descendants. This conclusion has been reached through other literature reviews, both for nonhumans (M Daly & Wilson 1978:140; Goy & McEwen 1980:58; Jaros & White 1983:132) and specifically in the case of humans (Serban 1976:283; AS Rossi 1977; JH Block 1983:1340; Ember & Ember 1985:289; Geary 1998:103).

An interesting experiment with a type of beetle indicated that the sex difference in caregiving was statistically significant only when both sexes were cooperating in providing care (which was typical of this particular species). Specifically, if the female beetle was removed by the researchers, the male partially compensated for her absence by substantially increasing his own parental effort on behalf of the grubs, although not to the full extent normally provided by females (Rauter & Moore 2004).

Table 9.1.4.10. Caring for one's own offspring/parenting activities.

Nature of Any Difference	Postpubertal	Multiple Age Categories
	Adult	
Males do so more	**BIRD** *Black Coucal*: Goymann et al. 2004b; *Coucal*: Andersson 1995; Ligon 1997; *Moorhen*: Petrie 1983 (nest brooding); *Jacana*: Jenni 1974; Butchart 2000; *Spotted Sandpiper*: Oring & Lank 1986; Oring et al. 1991 **FISH** *Cardinal Fish*: Kuwamura 1985 (mouthbrooding)	
No signif. difference	**PRIMATE (EXCEPT APE)** *Vervet Monkey*: LA Fairbanks 1996	
Females do so more	**AFRICA** *Congo*: Hewlett 1988 (AKA Pygmies of Africa); Hewlett 1992 (AKA Pygmies of Africa); *Kenya*: Harkness & Super 1992*; *South Africa*: MM West & Konner 1976 **ASIA** *China*: Ho 1986 **EUROPE** *Belgium*: Van Ranst et al. 1995 (grandchildren); *Germany*: Poshos 2000* (grandchildren); *Greece*: Pashos 2000* (grandchildren) **NORTH AMERICA** *Canada*: MS Smith 1988 (grandchildren); *United States*: RD Parke 1967; PW Berman 1976; SS Feldman & Nash 1979; E Hoffman 1979 (grandchildren); Hochschild 1989 (dual-earner families); Elrod & Crase 1980; Furstenberg & Nord 1985; La Rossa & La Rossa 1981; Hartshorne & Manaster 1982 (grandchildren);Furstenberg 1990; Bierenat & Wortman 1991 (two income couples); SL Blair & Lichter 1991; LA Leslie et al. 1991; CP Cowan & Cowan 1992; Harkness & Super 1992*; Perry-Jenkins & Folk 1994 (dual-earner families); GL Fox 1995; Amato & Booth 1996; Pleck 1997; Wilkie et al. 1998 (dual-earner families); Pittman et al. 1999; Salmon 1999 (grandchildren) **INTERNATIONAL** *Several Cultures*: Whiting & Edwards 1973; Crano & Aronoff 1978; Whiting & Edwards 1988; Belsky et al. 1989; Eibl-Eibesfeldt 1989; *Multiple Countries*: Parke 1995 **INSECT** *Beetle*: Fetherston et al. 1990: Rauter & Moore 2004:700; Smiseth & Moore 2004	**FISH** *Salmon*: AJ Hanson & Smith 1967; Tautz & Groot 1975; Schroder 1981; Quinn & Foote 1994; Quinn et al. 1996 **APES** *Bonobo:* Kano 1992; *Great Apes in General*: McGrew et al. 1996

9.1.4.11. Providing Care/Nurturance for Others (Except Offspring) in General

Nurturance involves the tendency to provide care for others, especially the very young or infirmed (Fogel et al. 1986:65). Studies have largely indicated that females are more prone toward nurturance than males (Table 9.1.4.11).

Table 9.1.4.11. Providing care/nurturance for others (except offspring) in general.

Nature of Any Difference	Prepubertal		Postpubertal	Multiple Age Categories
	Early Childhood	Childhood	Adult	
Males more				
No signif. difference	**NORTH AMERICA** *United States*: Hartup & Keller 1960			
Females more		**MIDDLE EAST** *Israel*: ME Spiro 1965 **NORTH AMERICA** *United States*: Schopler 1967 **INTERNATIONAL** *Multiple Societies*: Whiting & Edwards 1973	**NORTH AMERICA** *Canada*: JC Shaver & Allan 2005 (elderly and disabled); *United States*: Lindzey & Goldberg 1953 (college); RB Hays & Oxley 1986 (social support); SA Stephens & Chrstianson 1986 (for the elderly); R Stone et al. 1987 (for the elderly); Dwyer & Seecomb 1991 (for the elderly); Navaie-Waliser et al. 2002 (for the elderly)	**NORTH AMERICA** *United States*: Spangler & Thomas 1962

9.1.4.12. Caring for the Offspring of Others

In a number of species, a phenomenon known as "helpers at the nest" has been observed. As its name implies, this phenomenon was first described in birds, although it has since been found in mammalian species such as hyenas, mongooses, and meerkats, and possibly even in humans (Holden & Mace 1999:41). The main feature of the phenomenon is that adolescents or adults spend considerable time feeding and tending to the needs of infant siblings much as a parent would do. Typically, the nonparental caregivers are older siblings. According to a limited amount of evidence concerning any gender differences, males are the primary helpers at the nest among birds, but females appear to be more involved among mammals (Table 9.1.4.12).

Table 9.1.4.12. Caring for the offspring of others.

Nature of Any Difference					Postpubertal		Multiple Age Categories
					Adolescent	Adult	
Males more					**BIRD** *Multiple Species*: PB Stacey & Koenig 1990		**BIRD** *Woodpecker*: Lennortz et al. 1987; JR Walters 1990
No signif. difference							
Females more					**RODENT** *Meerkat*: Clutton-Brock et al. 2002	**PRIMATE (EXCEPT APE)** *Rhesus Macaque*: Gebber & Goy 1985	

9.1.4.13. Receiving Primary Custody of Children After Divorce (or Being a Single-Parent)

Studies have consistently revealed that mothers are more often awarded primary custody of their children than are fathers (Table 9.1.4.13).

Table 9.1.4.13. Receiving primary custody of children after divorce (or being a single-parent).

Nature of Any Difference						Postpubertal	Multiple Age Categories
						Adult	
Males more							
No signif. difference							
Females more						**NORTH AMERICA** *United States*: Elrod & Crase 1980; PC Glick 1988; Maccoby & Mnookin 1992; Silverstien 1996; Warshak 1996	**ASIA** *India*: Choudhary 1988; Amato 1994* **EUROPE** *Britain*: Power & Matthews 1997 **NORTH AMERICA** *United States*: Santrock 1975; Derdeyn 1976; Santrock 1977; Maccoby & Mnookin 1992; Amato 1994*; US Bureau of the Census 2001

9.1.4.14. Maintaining Social Contact With Parents in General

Studies of gender differences in maintenance of social contact between offspring and parents indicate that from toddlerhood onward, females are more likely than males to maintain contact with one or both parents (Table 9.1.4.14). This appears to be true across human cultures and among primates and even birds.

Table 9.1.4.14. Maintaining social contact with parents in general.

Nature of Any Difference	Prepubertal				Postpubertal	
	Infant	Toddler	Early Childhood	Childhood	Adolescent	
Males more						
No signif. difference	**NORTH AMERICA** *United States*: HA Moss 1967:22					
Females more	**NORTH AMERICA** *United States*: MR Gunnar & Donahue 1980 (with mother, 6, 9, 12 months old) **PRIMATE (EXCEPT APE)** *Baboon*: Rowell et al. 1968	**NORTH AMERICA** *United States*: Fagot 1978:462 **BIRD** *Chicken*: Workman & Andrew 1989 (visual contact)	**NORTH AMERICA** *United States*: IH Block 1976a	**APE** *Chimpanzee*: Pusey 1978 **PRIMATE (EXCEPT APE)** *Baboon*: Kummer 1968	**AFRICA** *South Africa*: Draper 1973 (!Kung tribe) **NORTH AMERICA** *United States*: RE Johnson & Marcos 1988	

9.1.4.15. Time Spent by Offspring Interacting With its Mother

In the case of humans and other animals, most studies of the time spent by offspring interacting with mothers is based on direct observation by researchers. For adolescents, studies usually rely on self-reports. As one can see in Table 9.1.4.15, most studies agree that female offspring spend more time socially interacting with their mothers than do male offspring. The breadth of species for which this generalization applies is considerable.

Table 9.1.4.15. Time spent by offspring interacting with its mother.

Nature of Any Difference	Prepubertal				Postpubertal
	Infant	Toddler	Early Childhood	Childhood	Adolescent
Male offspring more		**NORTH AMERICA** *United States*: DM Levy & Tulchin 1925 (in a novel environment)			
No signif. difference					
Female offspring more	**NORTH AMERICA** *United States*: S Goldberg & Lewis 1969; M Lewis 1972; Leiderman et al. 1973	**NORTH AMERICA** *United States*: J Brooks & Lewis 1974 **PRIMATE (EXCEPT APE)** *Rhesus Macaque*: Missakian 1974	**AFRICA** *South Africa*: RL Monroe & Monroe 1971 (!Kung tribe) **NORTH AMERICA** *United States*: Draper 1976	**UNGULATE** *Caribou*: CC Gates et al. 1986; *Deer*: FE Guinness et al. 1979	**NORTH AMERICA** *United States*: Montemayer 1983; LS Bensley et al. 1999b **APE** *Chimpanzee*: Van Lawick-Goodall 1973; Pusey 1983 **MARSUPIAL** *Wallaby*: C Johnson 1986 **UNGULATE** *Deer*: Nieminen 1988; *Elk*: Altmann 1960

9.1.4.16. Time Spent by Offspring Interacting With Its Father

So far, only one study was located that considered the time spent by offspring interacting with their fathers. This is no doubt due in large measure to the fact that in most species males have relatively little contact with offspring and when adult males do have contact with youngsters, it is rarely a known fact that the offspring is in fact his. The one available study, shown in Table 9.1.4.16, revealed no significant difference in time spent with their father by sons or daughters. This study was based on human subjects.

Table 9.1.4.16. Time spent by offspring interacting with its father.

Nature of Any Difference	Postpubertal
	Adolescent
Males more	
No signif. difference	**NORTH AMERICA** *United States*: LS Bensley et al. 1999b
Females more	

9.1.5. Social Interaction Outside the Family

Sex differences in the tendencies to socially interact with others outside one's family has been the focus of considerable research, the results of which are presented below.

9.1.5.1. Time Spent Socially Interacting Outside the Family or in General

Table 9.1.5.1 indicates that females usually spend more time socially interacting with others outside the home than do males, although a few studies have reached the opposite conclusion.

Table 9.1.5.1. Time spent socially interacting outside the family or in general.

Nature of Any Difference	Prepubertal	Postpubertal		Multiple Age Categories
	Early Childhood	Adolescent	Adult	
Males more		**ASIA** *India*: Grover et al. 2003:17 (young) **NORTH AMERICA** *United States*: Montemayer 1983	**RODENT** *Rat*: Johnston & File 1991	
No signif. difference				
Females more	**MIDDLE EAST** *Israel*: Tatar & Horenczyk 1996 (closer to teachers) **NORTH AMERICA** *United States*: Zunich 1964 (response to failure); Kesner 2000 (school age)	**NORTH AMERICA** *United States*: Winker 1949 **APE** *Chimpanzee*: Pusey 1983	**EUROPE** *Netherlands*: Bensing et al. 1993 (physician-patient) **NORTH AMERICA** *United States*: Belle 1987 (provide social support); Ryff 1989:1075 (self-rated); Wohlgemuth et 1991 (provide social support); Ptacek et al. 1992 (provide social support); C West 1993 (physicians); JA Hall et al. 1994; Vandervoort 2000; Dumais 2002 (college, cultural activities); MacGeorge et al. 2003 (college, provide social support)	**EUROPE** *Netherlands*: Bensing et al. 1993 (physician-patient) **NORTH AMERICA** *United States*: Leik 1963; JA Hall et al. 1994 (physician-patient)

9.1.5.2. Social Attachment in General

General tendencies toward social attachment have been assessed primarily on the basis of the time spent in close proximity to conspecifics (members of one's own species). Studies of nonhumans have concluded that females exhibit greater overall social attachment than males (Table 9.1.5.2).

Table 9.1.5.2. Social attachment in general.

Nature of Any Difference	Prepubertal
	Toddler
Male stronger	
No signif. difference	
Females stronger	**BIRD** *Chicken*: Vallortigara & Zanforlin 1988; Vallortigara & Andrew 1989 **RODENT** *Japanese Macaque*: GG Eaton et al. 1985:243

9.1.5.3. Social Interaction in Larger Groups

From early childhood onward, studies of both humans and non-humans have concluded that males are more likely than females to be assembled into large groups (Table 9.1.5.3).

Table 9.1.5.3. Social interaction in larger groups.

Nature of Any Difference	Prepubertal		Postpubertal	
	Early Childhood	Childhood	Adolescent	Adult
Males more	**NORTH AMERICA** *United States*: Halvorson & Waldrop 1973; Lever 1976	**NORTH AMERICA** *United States*: Waldrop & Halvorson 1975 (7 ½ year olds); Lewer 1976; Eder & Hallinan 1978	**PRIMATE (EXCEPT APE)** *Baboon*: Crooke 1966*; *Japanese Macaque*: Kawai 1958; *Japanese Macaque*: Sugiyama 1960; *Langur*: Sugiyama 1964*; Jay 1965*; Yoshiba 1968*	**PRIMATE (EXCEPT APE)** *Baboon*: Crooke 1966*; *Langur*: Sugiyama 1964*; Jay 1965*; Yoshiba 1968*
No signif. difference				
Females more				

9.1.5.4. Social Interaction in Smaller Groups

According to numerous studies, when females socially interact, they do so in significantly smaller groups than is true for males (Table 9.1.5.4). Typically, females are more often drawn to interact on a one-to-one basis, whereas males socially congregate with considerably larger numbers of conspecifics. Interestingly, this generalization appears to be true for both humans and for chimpanzees.

Table 9.1.5.4. Social interaction in smaller groups.

Nature of Any Difference	Prepubertal		Postpubertal		Multiple Age Categories
	Early Childhood	Childhood	Adolescent	Adult	
Males more					
No signif. difference					
Females more	**NORTH AMERICA** *United States*: Laosa & Brophy 1972; Lever 1974; Benenson 1993	**LATIN AMERICA** *Brazil*: de Guzman et al. 2004 **NORTH AMERICA** *Canada*: Benenson et al. 1997; Benenson et al. 2002; *United States*: Feshbach & Roe 1971; Waldrop & Halverson 1975; Lever 1976; Eder & Hallinan 1978; Pitcher & Schultz 1983; Belle 1989; Benenson 1990; Benenson et al. 1997*; Cairns et al. 1998 (one-to-one); Markovits et al. 2001*	**NORTH AMERICA** *United States*: Savin-Williams 1980; Berndt & Hoyle 1985; Benenson et al. 1997*; Markovits et al. 2001*	**EUROPE** *Germany*: Schurtz 1902 (one-to-one) **NORTH AMERICA** *United States*: Gabriel & Gardner 1999 (one-to-one) **APE** *Chimpanzee*: Wrangham et al. 1992 (one-to-one); De Waal 1994 (one-to-one)	**NORTH AMERICA** *United States*: Tiger 1969 (one-to-one) **APE** *Chimpanzee*: Boesch & Boesch-Achermann 2000 (one-to-one)

9.1.5.5. Social Interaction With Deviant Peers

One study found that males were more likely than females to associate with "deviant" peers, with deviance primarily having to do with delinquent and unruly behavior (Table 9.1.5.5).

Table 9.1.5.4. Social interaction with deviant peers.

Nature of Any Difference					Postpubertal		
					Adolescent		
Males more					**EUROPE** *Sweden*: R Svensson 2003		
No signif. difference							
Females more							

9.1.5.6. Social Interaction in Academic Settings

Studies of the extent to which students and teachers interact, especially during class, have concluded that male students and teachers interact more than do female students and teachers (Table 9.1.5.6).

Table 9.1.5.6. Social interaction in academic settings.

Nature of Any Difference					Postpubertal		
					Adolescent	Adult	
Males more					**EUROPE** *Britain*: Salisbury & Jackson 1996 **NORTH AMERICA** *United States*: Sadker & Sadker 1985	**NORTH AMERICA** *United States*: Fassinger 1995 (college, self-report)	
No signif. difference							
Females more							

9.1.5.7. Moving From Where One Grew Up in General

Numerous studies have investigated gender differences in the tendency to move away from where one grew up. Most of these studies have involved nonhumans. As shown in Table 9.1.5.7, most studies have found that males are more likely than females to take up residence away from where they grew up. While most of the research has involved various species of nonhuman primates, the research with humans has indicated that they conform to the general primate pattern. One of the few species that does not appear to conform to the primate pattern is the chimpanzee.

Table 9.1.5.7. Moving from where one grew up in general.

Nature of Any Difference	Postpubertal		Multiple Age Categories
	Adolescent	Adult	
Males more likely to leave	**NORTH AMERICA** *United States*: Hewison & Gaillard 1996 **CANINE** *Spotted Hyena*: Goymann et al. 2001 **PRIMATE (EXCEPT APE)** *Baboon*: KR Hall 1965; Rowell 1972:42; Rudran 1973; Dunbar & Dunbar 1975; Hausfater 1975; Packer 1979; Hausfater et al. 1982; *Blue Monkey*: Rudran 1978; *Capuchin Monkey*: Oppenheimer 1968; *Colobus Monkey*: Oates 1977; *Howler Monkey*: NJ Scott et al. 1978; Rudran 1979; *Japanese Macaque*: Kawai 1958; Lindburg 1969; Simonds 1973; Angst 1975; Sugiyama 1976; Dittus 1977; *Langur*: Poirier 1969; Hrdy 1977; *Lemur*: Budnitz & Dainis 1975; *Mangabey Monkey*: Struhsaker & Leland 1979; *Olive Baboon*: C Packer 1975; *Red-tail Monkey*: Struhsaker 1977; *Rhesus Macaque*: Sade 1972; Sade 1967; Lindburg 1969; Boelkins & Wilson 1972; Drickamer & Vessey 1973; Tilford 1982; Meikle et al. 1984:176; *Spider Monkey*: Symington 1987 **UNGULATE** *Red Deer*: Clutton-Brock et al. 1968:460	**INTERNATIONAL** *Multiple Societies*: Pasternak et al. 1997 (young) **PRIMATE (EXCEPT APE)** *Japanese Macaque*: Kawai & Yoshiba 1968 (young); Sugiyama 1976 (young)	
No signif. difference			
Females more likely to leave	**PRIMATE (EXCEPT APE)** *Spider Monkey*: Fedigan & Baxter 1984; F White 1986; Symington 1987; CA Chapman et al. 1989		**APE** *Chimpanzee*: Van Lawick-Goodall 1973:6

9.1.5.8. Visiting Friends and Neighbors

Findings have not been consistent regarding any gender differences in the extent to which persons visit friends and neighbors although most studies suggest this is more characteristic of females than of males (Table 9.1.5.8).

Table 9.1.5.8. Visiting friends and neighbors.

Nature of Any Difference					Postpubertal		Multiple Age Categories
					Adolescent		
Males more							**NORTH AMERICA** *United States*: Taub et al. 1970
No signif. difference							**NORTH AMERICA** *United States*: Tomeh 1964; Tomeh 1967
Females more					**NORTH AMERICA** *United States*: HD Johnson 2004:250 (socializing with friends)		**NORTH AMERICA** *United States*: Tallman & Morgner 1970; Unger & Wandersman 1982; KE Campbell & Lee 1990:500

9.1.5.9. Attending to and Providing Emotional Support to Others

All of the available research has concluded that females are more likely than males to devote more time and effort to providing emotional support to others (Table 9.1.5.9).

Table 9.1.5.9. Attending to and providing emotional support to others.

Nature of Any Difference						Postpubertal
						Adult
Males more						
No signif. difference						
Females more						**NORTH AMERICA** *United States*: Vaux 1985; Rosario et al. 1988; Barbee et al. 1990; Barbee et al. 1993; Derlega et al. 1994; Trobst et al. 1994; KD Michelson et al. 1995 (inquiring about personal problems)

9.1.5.10. Social Adjustment to Divorce

Although the evidence is not unanimous, most studies have indicated that females report having greater difficulties socially adjusting following a divorce than do males (Table 9.1.5.10).

Table 9.1.5.10. Social adjustment to divorce.

Nature of Any Difference						Postpubertal
						Adult
Males more						**NORTH AMERICA** *United States*: Kendler et al. 2003 (problems at work after divorce)
No signif. difference						
Females more						**NORTH AMERICA** *United States*: Wagner & Lompas 1990 (problems in interpersonal, non-romantic relationships after divorce); Kellner et al. 2001 (problems in interpersonal, non-romantic relationships after divorce); Nolen-Hoeksema 2001 (problems in interpersonal, non-romantic relationships after divorce)

9.1.6. Living Arrangements

A few studies have compared males and females regarding the types of living arrangements they have. Results are summarized below.

9.1.6.1. Living Alone

A couple of studies among elderly persons have concluded that women are more likely than men to live alone (Table 9.1.6.1). This is likely to largely reflect the fact that females tend to outlive males.

Table 9.1.6.1. Living alone.

Nature of Any Difference						Postpubertal
						Adult
Males more						
No signif. difference						
Females more						**EUROPE** *Germany*: J Smith & Baltes 1998 (elderly) **NORTH AMERICA** *United States*: Soldo et al. 1997 (elderly)

9.1.6.2. Living in a Nursing Home

According to one study, females are more likely than males to be living in nursing homes (Table 9.1.6.2), an observation that is likely to reflect at least in part the longer life expectancy among females.

Table 9.1.6.2. Living in a nursing home.

Nature of Any Difference	Multiple Age Categories
Males more	
No signif. difference	
Females more	**NORTH AMERICA** *United States*: Schneider & Guralmik 1990 (elderly)

9.1.6.3. Living in an Institution/Hospital

One study of mentally retarded persons concluded that preadolescent males were more likely than their female counterparts to be institutionalized (Table 9.1.6.3).

Table 9.1.6.3. Living in an institution/hospital.

Nature of Any Difference	Prepubertal
	Childhood
Males more	**NORTH AMERICA** *United States*: Hollingworth 1922 (mental retardation)
No signif. difference	
Females more	

9.1.7. Social Activities

Research findings pertaining to sex differences in a variety of social activities are reviewed in the following section.

9.1.7.1. Involvement in Spontaneous (Rather Than Organized) Social Activities

According to a limited number of studies, female primates, including humans, are more involved in social activities in general than are males (Table 9.1.7.1).

Table 9.1.7.1. Involvement in spontaneous (rather than organized) social activities.

Nature of Any Difference	Prepubertal	Postpubertal	Multiple Age Categories
	Infant	Adult	
More in males			
No signif. difference			
More in females	**PRIMATE (EXCEPT APE)** *Howler Monkey*: MR Clarke 1990* (with both sexes)	**PRIMATE (EXCEPT APE)** *Howler Monkey*: MR Clarke 1990* (both sexes)	**NORTH AMERICA** *United States*: Badoms 1968:199

9.1.7.2. Having Intimate Friendships/Social Relationships

All available studies have concluded that females are more likely than males to have intimate friendly social relationships with others (Table 9.1.7.2).

Table 9.1.7.2. Having intimate friendships/social relationships/confidant.

Nature of Any Difference	Prepubertal		Postpubertal		Multiple Age Categories
	Early Childhood	Childhood	Adolescent	Adult	
Males more					
No signif. difference					
Females more	**NORTH AMERICA** *United States*: JE Burr et al. 2005	**NORTH AMERICA** *United States*: Pitcher & Schultz 1983; Furman & Buhrmester 1985; Belle 1989; Lansford & Parker 1999	**NORTH AMERICA** *United States*: Sharabany et al. 1981; Wheeler et al. 1983; Bukowski & Kramer 1986 (cross-sex); Lempers & Clark-Lempers 1993; Golombok & Fivush 1994; DeBacker & Nelson 2000 (self-rated); HD Johnson 2004:250	**EUROPE** *Britain*: Fuhrer et al. 1999 (among civil servants) **NORTH AMERICA** *Canada*: Schiedel & Marcia 1985; *United States*: Jourard & Richman 1963 (young); E Powers & Bultena 1976 (elderly); Caldwell & Peplau 1982 (intimate verbal interactions); BF Turner 1982 (young); PH Wright 1982 (same-sex); RB Hays 1984; RB Hays 1985; HT Reis et al. 1985 (same-sex); HT Reis 1986; Helgeson et al. 1987 (same-sex); Barth & Kinder 1988; HT Reis 1988 (same-sex); JT Wood & Inman 1993; JT Wood 1994; BJ Bank & Hansford 2000 (same-sex) **OCEANIA** *Australia*: Leung & Moore 2003; Coventry et al. 2004 **INTERNATIONAL** *Multiple Countries*: Aukett et al. 1988 (friendly verbal interactions)	**NORTH AMERICA** *United States*: Lowenthal & Haven 1968; Sharabany et al. 1981 (same-sex); Flaherty & Richman 1989; Berkman et al. 1993:112

9.1.7.3. Having Activity-Based/Goal Oriented Social Relationships

When forming friendships with others, studies have found males to be more focused on achieving specific goals than females (Table 9.1.7.3). These goals usually involve sports activities, hobbies, or work.

Table 9.1.7.3. Having activity-based/goal oriented social relationships.

Nature of Any Difference					Postpubertal	
					Adolescent	Adult
More by males					**NORTH AMERICA** *United States*: Camarena et al. 1990 (young, same-sex)	**NORTH AMERICA** *United States*: M Caldwell & Peplau 1982 (same-sex); PH Wright 1982 (among same-sex friendships); Helgeson et al. 1987 (same-sex); Ibarra 1993 (young managers who have mentors)
No signif. difference						
More by females						

9.1.7.4. Involvement in Extended Kinship Activities and Networks

One study found females being more involved than males in kinship activities and networks (Table 9.1.7.4).

Table 9.1.7.4. Involvement in extended kinship activities and networks.

Nature of Any Difference							Multiple Age Categories
More by males							
No signif. difference							
More by females							**NORTH AMERICA** *United States*: B Adams 1968:169

9.1.7.5. Immigration/Dispersal/Size of Home Range (Except Among Birds)

Most of the research on the extent to which males and females leave their social group of origin (natal group) has involved a wide variety of nonhuman species. The time of life when most animals are more likely to leave their natal group is soon after the onset of puberty; thus it is sometimes known as juvenile dispersal (Dobson 1982).

Much of this research has been driven by theoretical work that predicts that natural selection favors homogametic hybridization more than heterogametic hybridization (Haldane 1922; Turelli & Orr 2000). In mammals, males are the heterogametic sex (XY); therefore, according to Haldane's theoretical reasoning, males should seek to hybridize more than females seek to do so. In fish and birds, on the other hand, females are the heterogametic sex (YW), so in these species, females should disperse more than males. Among mammals, other factors that may contribute to greater male dispersal in most species is the fact that reproductively successful males are those who successfully establish and maintain ownership over their own territory, which often requires abandoning parents and other close relatives. The types of mate bonding patterns that animals exhibit might also relate to sex differences in dispersal patterns. In particular, in non-monogamous species, males appear to be especially likely to disperse following the onset of puberty, whereas in monogamous species, both sexes tend to disperse to roughly equal degrees (Dobson 1982).

Table 9.1.7.5 presents the findings on dispersal for all phyla other than birds. Overall, the evidence provides support for Haldane's evolutionary reasoning. Among most species of mammals, including humans, males have been found to disperse more than do females.

Table 9.1.7.5. Immigration/dispersal/size of home range (except among birds).

Nature of Any Difference					Postpubertal		Multiple Age Categories
					Adolescent	Adult	
Males immigrate/ disperse more					**APE** *Gibbon*: CR Carpenter 1940; Ellefson 1974 **CANINE** *Wolf*: Mech 1970; Fritts & Mech 1981 **FELINE** *Lion*: Schaller 1972; Bertram 1975 **HARE** *Pika*: Tapper 1973; AT Smith 1978; Svendsen 1979 **MAMMAL** *Dwarf Mongoose*: Rasa 1977; Rood 1978; *Fur Seal*: JE King 1964; Warneke 1975 **MARSUPIAL** *Wallaby*: JH Kaufmann 1974 **PRIMATE (EXCEPT APE)** *Blue Monkey*: Rudran 1978; *Gelada Baboon*: Dunbar & Dunbar 1975; Ohsawa 1979; *Hanuman Langur*: Sugiyama 1965; Sugiyama 1967; *Howler Monkey*: CR Carpenter 1965; *Japanese Macaque*: Sugiyama 1976; *Patas Monkey*: KR Hall 1975; *Red-Fronted Lemur*: Wimmer & Kappeler 2002; *Red-Tail Monkey*: Struhsaker 1977; *Rhesus Macaque*: Lindberg 1969; Drickamer & Vessey 1973; *Sifaka Lemur*: Richard et al. 1993; *Tamarin*: GA Dawson 1977; JF Eisenberg 1977; Neyman 1977; *Toque Macaque*: Dittus 1975; Dittus 1979 **PROSIMIAN** *Bushbaby*: AB Clark 1978 **RODENT** *Beach Mouse*: MH Smith 1968; Foltz 1981; *Beaver*: Tawnsend 1953; *Chipmunk*: SF Smith 1977; L Elliot 1978; Y Ahner 1978; *Coati*: Kaufmann 1962; *Deer Mouse*: Dice & Howard 1951; Birdsall & Nash 1973; Fairbairn 1978; *Gopher*: JL Patton & Feder 1981; *Ground Squirrel*: FC Evans & Holdenried 1943; Fitch 1948; Balph & Stokes 1963; Rongstad 1965; McCarley 1966; Carl 1971; Yeaton 1972; Slade & Balph 1974; Dunford 1977; Michener & Michener 1977; Owings et al. 1977; PW Sherman 1977; Murie & Harris 1978; FS Dobson 1979; Michener 1979; Boag & Murie 1981; Hanken & Sherman 1981; FS Dobson 1982; *Marmot*: Barash 1973; KB Armitage & Downhower 1974; Downhower & Armitage 1981; *Muskrat*: Beer & Meyer 1951; Mallach 1971; Steiniger 1976; *Prairie Dog*: Foltz & Hoogland 1981; Hoogland 1981; *Prairie Vole*: Gaines et al. 1979; JA Thomas & Birney 1979; *Raccon*: Fritzell 1978; *Woodchuck*: FH Bronson 1964 **UNGULATE** *African Buffalo*: AR Sinclair 1974; *African Elephant*: Laws 1974; Douglas-Hamilton & Douglas-Hamilton 1975; *Dik Dik*: Hendrichs & Hendrichs 1971; *Mountain Sheep*: Geist 1971; *Red Deer*: Darling 1937; VP Lowe 1966; *Reedbuck*: H Hendrichs 1975; *Soay Sheep*: P Grubb & Jewell 1966; *Vicuna*: Kaford 1957; Franklin 1974; *White-Tail Deer*: Kammermeyer & Marchinton 1976; McCullough 1979	**AFRICA** *Kenya*: Agesa & Agesa 1999 (rural to urban migration) **INTERNATIONAL** *Multiple African Countries*: Brockerhoff & Eu 1993 (Sub-Saharan males migrate more); Lucas 1997 **INTERNATIONAL** *Multiple Countries*: J Armitage & Sabot 1991; Lucas 1997 **FISH** *Guppies*: DP Croft et al. 2003 (upstream from release point)	**AFRICA** *Kenya*: Agesa & Agesa 2005 (rural to urban migration) **EUROPE** *Multiple European Countries*: EP Hutchinson 1956 (to the United States, 1820-1920); Angrist 2002:1036 (to the United States, 1900-1930) **CANINE** *Spotted Hyena*: Kruuk 1972 **MAMMAL** *Rabbit*: N Webb et al. 1995 **PRIMATE (EXCEPT APE)** *Black & White Colobus Monkey*: Oates 1977; *Olive Baboon*: C Packer 1979; *Purple-Faced Langur*: Rudran 1973; *Red-Fronted Lemur*: Ostner & Kappeler2004; *Ringtail Lemur*: Sussman 1992; *Spider Monkey*: LM Fedigan & Baxter 1984; *Yellow Baboon*: Altmann & Altmann 1970; Hausfater 1975 **RODENT** *House Mouse*: FP Rowe et al. 1963; DeLong 1967; JH Myers 1974; Lidicker 1976; *Marmot*: Schwartz & Armitage 1980
No signif. difference					**APE** *Gorilla*: AH Harcourt 1978 **PRIMATE (EXCEPT APE)** *Hamadryas Baboon*: Kummer 1968; *Red Colobus*: Struhsaker & Struhsaker-Leland 1979 **RODENT** *Gray Squirrel*: Thompson 1977; Thompson 1978; *Red Squirrel*: CC Smith 1968; Kemp & Keith 1970; Rusch & Reeder 1978; *Sand Rat*: M Daly & Daly 1975 **UNGULATE** *Zebra*: Klinger 1974		
Females immigrate/ disperse more					**APE** *Chimpanzee*: Sugiyama 1973; Pusey 1980 **CANINE** *African Wild Dog*: Kuhme 1965; Frame & Frame 1976; Frame et al. 1979 **RODENT** *Bat*: Bradbury & Emmons 1974; Bradbury & Vehrencamp 1976; Bradbury & Vehrencamp 1977		**FISH** *Barbus*: Chenuil et al. 2004

9.1.7.6. Dispersal Among Birds

A surprisingly large number of studies have compared male and female birds with respect to dispersal. Therefore, the results are summarized in an entirely separate set of split-tables. Dispersal in birds is usually assessed by banding the legs of large numbers of birds so that their movements can be periodically assessed.

Two types of dispersal are widely recognized by ornithologists: One is called *natal dispersal*, a type of dispersal that occurs following being hatched but before breeding begins. The second type is known as *breeding dispersal*. As its name implies, this type of dispersal occurs during the time birds are actively breeding (PJ Greenwood & Harvey 1982). The two types of dispersal are identified in Split-Table 9.1.7.6a and Split-Table 9.1.7.6b, respectively.. In several studies, both types of dispersal were observed, sometimes without being specific; these are listed in the “multiple age categories” column of Split-Table 9.1.7.6b.

In many cases, researchers studying dispersal among birds distinguished the proportions of males and females who dispersed from the average distance each sex traveled when they dispersed. Consequently, qualifiers are inserted after the citation to most studies to indicate which of these two indicators of dispersal was reported.

As one can see by viewing Table 9.1.7.6a, prepubertal females disperse in greater proportions and longer distances than do males in the majority of bird species, although there are many species in which no significant sex differences were documented. Most of the species in which males disperse more than females were confined to natal dispersal among water fowl.

Split-Table 9.1.7.6a. Dispersal among birds, prepubertals.

Nature of Any Difference	Prepubertal				
			Childhood		
Males more			**BIRD** *Adelie Penguin*: Ainley & DeMaster 1980 (proportion); Ainley et al. 1983 (proportion); *Canadian Goose*: Lessells 1985* (proportion & distance); *Goshawk*: Kenward et al. 1993 (distance); *Great Bustard*: Alonso & Alonso 1992 (proportion); *Long-Tailed Duck*: Alison 1977 (proportion); *Mute Swan*: AE Coleman & Minton 1979 (proportion & distance); *Pintail Duck*: Sowls 1955 (proportion); *Spotted Sandpiper*: Reed & Oring 1993* (proportion)		
No signif. difference			**BIRD** *Blue-Footed Booby*: Osorio-Beristain & Drummond 1993 (distance); *Cliff Swallow*: Mayhew 1958 (proportion); CR Brown & Brown 1992 (proportion); *Great Reed Warbler*: Bensch & Hasselquist 1991 (proportion & distance); *Hen Harrier*: Picozzi 1984 (distance); *Large Cactus Finch*: BR Grant & Grant 1989 (distance); *Magpie*: Birkhead et al. 1986* (distance); *Nuthatch*: Matthysen & Schmidt 1987 (distance); *Pied Flycatcher*: Berndt & Sternberg 1969 (distance); Potti & Montalvo 1991 (proportion & distance); *Sage Grouse*: PO Dunn & Braun 1985 (proportion); *Song Sparrow*: Weatherhead & Boak 1986 (proportion); Arcese 1989 (proportion & distance); *South Polar Skua*: Ainley et al. 1990* (distance); *Sparrow Hawk*: I Newton et al. 1989 (distance); *Wren Tit*: M Baker et al. 1995 (proportion & distance); *Zebra Finch*: Zann 1994 (distance); Zann & Runciman 1994 (distance)		
Females more			**BIRD** *Blue Grouse*: Jamieson & Zwickel 1983 (distance); *Blue Tit*: Zeh et al. 1985 (proportion); *Common Babbler*: Gaston 1978 (proportion); *Cory's Shearwater*: Thibault 1993 (proportion & distance); *Florida Scrub Jay*: Woolfender & Fitzpatrick 1984* (proportion & distance); *Great Tit*: Bulmer 1973 (distance); PJ Greenwood et al. 1979 (distance); *Groove-Billed Ani*: Bowenj et al. 1989 (proportion & distance); *Helmeted Honeyeater*: Runciman et al. 1995 (proportion); *Herring Gull*: Chabrzyk & Coulson 1976 (proprtion); *Hobby Falcon*: Fiuczynski 1978 (proportion); *House Sparrow*: RC Fleischer et al. 1984 (distance); *Kittiwake*: Coulson & Neve De Mevergines 1992 (proportion); *Layson Albatross*: HI Fisher 1971 (proportion); *Manx Shearwater*: Brooke 1978 (proportion & distance); *Marsh Tit*: Nilsson 1989 (distance); *Pinyon Jay*: Marzluff & Balda 1989 (proportion); *Red-Neck Phalarope*: JD Reynolds & Cooke 1988* (proportion); *Red-Winged Fairy-Wren*: Rowley et al. 1988 (proportion); *Ruffed Grouse*: RJ Small & Rusch 1989 (proportion & distance); *Sage Grouse*: PO Dunn & Braun 1985* (distance); *Spruce Grouse*: Schroeder 1985 (proportion); *Shag*: Aebischer et al. 1995 (proportion); *Sparrow Hawk*: I Newton & Marquiss 1982 (proportion & distance); I Newton & Marquiss 1983 (proportion & distance); *Spruce Grouse*: Schroeder 1985 (proportion); Keppie & Towers 1992 (proportion); *Splendid Fairy-Wren*: EM Russell & Rowley 1993 (proportion & distance); *Striped-Back Wren*: Rabenold 1985 (proportion & distance); *Tengmalm's Owl*: Sonerud et al. 1988 (proportion); *Welsh Dipper*: SJ Tyler et al. 1990* (proportion & distance); *White-tailed Ptarmigan*: Giesen & Braun 1993; *Willow Warbler*: Lawn 1983* (proportion)		

Turning to postpubertal (breeding) dispersal, Split-Table 9.1.7.6b shows that in most species, females are more likely to disperse (or to do so over greater distances) than males. According to one scientist who has studied bird dispersal extensively (PJ Greenwood 1980), monogamy is related to greater tendencies toward females migrating to where males reside rather than vice versa. He then argued that because most birds are largely monogamous, whereas most mammals tend toward non-monogamy, one finds female dispersal to be more common among birds and male dispersal to be more common among mammals.

Split-Table 9.1.7.6b. Dispersal among birds, postpubertals.

Nature of Any Dif-ference					Postpubertal		Multiple Age Categories
					Adolescent	Adult	
Males more							**BIRD** *Eider Duck*: Baillie & Milne 1989 (proportion); *Lesser Snow Goose*: RF Rockwell & Cooke 1977 (proportion); Cooke et al. 1983
No signif. difference					**BIRD** *Magpie*: Dhindsa & Boag 1992 (proportion); *Shag*: Aebischer et al. 1995* (proportion)	**BIRD** *Bay-Winged Cowbird*: Fraga 1991* (proportion); *Brambling*: Lindstrom 1987 (proportion); *Canadian Goose*: Lessells 1985* (proportion & distance); *Florida Scrub Jay*: Woolfender & Fitzpatrick 1994* (proportion & distance); *Harris' Sparrow*: Norment 1994 (proportion); *Red-Necked Phalarope*: JD Reynolds & Cooke 1988* (proportion & distance); *Redwing Blackbird*: Bjerke & Espmark 1988 (distance); *Spotted Sandpiper*: Reed & Oring 1993* (proportion); *Welsh Dipper*: SJ Tyler et al. 1990* (distance); *Willow Warbler*: Lawn 1983* (proportion)	**BIRD** *Acorn Woodpecker*: Kaenig & Mumme 1987 (proportion); *Greenfinch*: PJ Greenwood & Harvey 1977 (distance); *Lapwing*: PS Thompson et al. 1994 (proportion & distance); *Piping Plover*: Haig & Oring 1988 (proportion & distance); *Styan's Grasshopper Warbler*: Nagata 1993* (proportion); *Whinchat*: Bastian 1992 (distance)
Females more					**BIRD** *Gannet*: B Nelson 1978 (proportion); *House Wren*: Drilling & Thompson 1988 (proportion & distance); *Magpie*: Birkhead et al. 1986* (distance); *Song Thrush*: PW Savies & Snow 1965 (proportion)	**BIRD** *Bay-Winged Cowbird*: Fraga 1991* (distance); *Bobalink*: Bollinger & Gavin 1989 (proportion & distance); *European Blackbird*: PJ Greenwodd & Harvey 1977 (distance); Desrochers & Magrath 1993 (distance); *Gray Catbird*: Darley et al. 1977 (proportion); *Great Tit*: PH Harvey et al. 1979 (distance); *Killdeer*: Lenington 1975 (proportion); *Kirtland's Warbler*: AJ Berger & Radabaugh 1968 (proportion & distance); *Pied Flycatcher*: PH Harvey 1984 (distance); *Piping Plover*: LR Wilcox 1959 (distance); *Prairie Warbler*: Nolan 1978 (proportion); *Puerto Rican Vireo*: Woodworth et al. 1998 (proportion); *Red Bunting*: Haukioja 1971 (proportion & distance); *Reed Warbler*: Catchpole 1972 (proportion); *Rufous-Collared Sparrow*: SM Smith 1978 (proportion); *Skylark*: Delius 1965 (distence); *Snowy Plover*: Paton & Edwards 1996 (proportion); *South Polar Skua*: Ainley et al. 1990 (distance); Pietz & Parmelee 1994 (proportion); *White Bearded Manakin*: Lill 1974 (proportion); *White-Crowned Sparrow*: Petrinovich & Patterson 1982 (proportion)	**BIRD** *Black-Tailed Godwit*: Groen 1993; *Cactus Wren*: AH Anderson & Anderson 1973 (proportion); *Collard Flycatcher*: Part & Gustafsson 1989 (proportion & distance); *Dunlin*: DB Jackson 1994 (distance); *Nazca Booby*: Huyvaert & Anderson 2004; *Red-Cockaded Woodpecker*: JR Walters et al. 1988 (proportion & distance); JR Walters 1992 (proportion & distance); *Styan's Grasshopper Warbler*: Nagata 1993* (distance); *Superb Fairy Wren*: Mulder 1995 (proportion); *Tengmalm's Owl*: Korpimaki 1987 (proportion & distance); Korpimaki & Lagerstrom 1988 (proportion & distance); *Wood Thrush*: RR Roth & Johnson 1993 (proportion)

9.1.7.7. Peripheralization

Peripheralization refers to the tendency for individuals to permanently leave their natal troop and then join a same-sex peer group and later become part of a larger mixed-sex troop other than the one from which the animal originated. As a special type of immigration/dispersal, peripheralization usually occurs shortly following the onset of puberty and normally continues through at least early adulthood. Often times, peripheralization seems to be voluntary in the sense that peripheralized individuals leave their natal troop without being pressured to do so by other troop members. However, at least in some species, peripheralization often follows episodes of "harassment" by fully adult males (who are usually troop leaders).

This social phenomenon has been primarily documented among species of primates and may be evolutionarily related to the tendency of humans to join gangs during adolescence (see subsequent table). As shown in Table 9.1.7.7, all studies of peripheralization have concluded that it is more common among males than among females.

Table 9.1.7.7. Peripheralization.

Nature of Any Dif-ference					Postpubertal		Multiple Age Categories
					Adolescent	Adult	
Males peripheralized more					**PRIMATE (EXCEPT APE)** *Japanese Macaque*: Hazama 1964; *Olive Baboon*: Packer 1975; *Rhesus Macaque*: Koford 1963; Boelkins & Wilson 1972; Drickamer & Vessey 1973; *Toque Macaque*: Dittus 1975	**PRIMATE (EXCEPT APE)** *Howler Monkey*: MR Clarke 1990 (forced out of troop, young)	**PRIMATE (EXCEPT APE)** *Baboon*: KR Hall 1963; DeVore & Hall 1965; Rowell 1969; Stoltz & Saayman 1970; WJ Hamilton et al. 1975; CM Anderson 1981; Ransom 1981; Rasmussen 1981; DA Collins 1984; Rasmussen 1985; LH Watson 1985; Lejeune 1986; Bercovitch 1988; DJ Brand 1994; Cowlishaw 1995; Noe & Shuijter 1995; Kenyatta 1995; Henzi & Lycett 1995; Sapolsky 1996; Bentley-Condit & Smith 1997; *Langur*: Gartlan & Brain 1968; *Rhesus Macaque*: Lindburg 1969; Sade 1980
No signif. difference							
Females peripheralized more							

9.1.7.8. Gang Membership/Involvement

All available evidence suggests that males are more likely than females to be involved in gangs (Table 9.1.7.8). As noted above, gang membership may be the human equivalent of peripheralization among nonhuman primates and may also reflect a general mammalian tendency for males to disperse from their natal territory more than females.

Table 9.1.7.8. Gang membership/involvement.

Nature of Any Difference				Postpubertal		Multiple Age Categories
				Adolescent		
Males more				**ASIA** *Japan*: Azuma 1974 **NORTH AMERICA** *United States*: WB Miller 1975:23; MI Cohen et al. 1995; MW Klein & Crawford 1995; Esbensen & Deschenes 1998; Esbensen et al. 1999:46		**NORTH AMERICA** *United States*: GD Curry et al. 1994; AP Goldstein & Glick 1994; Eshensen & Winfrue 1998
No signif. difference						
Females more						

9.2

ENGAGING IN AND SEEKING TO RECEIVE PRO-SOCIAL ACTIONS

Research undertaken to determine if males or females are more likely to engage in pro-social acts and/or to seek to obtain such acts from others are the focus of this section.

9.2.1. Acts of Altruism and Sharing

Altruistic acts are ones intended to help others even in the face of hardship to the altruist. Studies of sex differences in altruism and sharing are reviewed below.

9.2.1.1. Behaving Altruistically/Pro-socially in General

Altruism refers to self-sacrificing behavior on behalf of others (or an expressed willingness to engage in such behavior). Measuring such behavior is complicated by the fact that the degree of sacrifice can vary from minimal (sharing food with someone who is hungry or taking time to help a disabled person cross an intersection) to life threatening (jumping into a raging river to save someone from drowning). Another difficulty confronting attempts to scientifically study altruistic behavior is that the behavior is not a common event. Thus, most attempts to measure it rely on self-reports, the accuracy of which can certainly be questioned. As shown in Table 9.2.1.1, several studies have failed to find significant gender differences in altruism or prosocial behavior, but all have concluded that females exhibit such behavior to a greater degree than males.

Table 9.2.1.1. Behaving altruistically/pro-socially in general.

Nature of Any Dif-ference	Prepubertal				Postpubertal		Multiple Age Categories
				Childhood	Adolescent	Adult	
More in males							
No signif. difference				**EUROPE** *Britain*: Emler & Rushton 1974; Rushton & Wiener 1975 **NORTH AMERICA** *United States*: MB Harris 1970; Presbie & Coiteux 1971; KH Rubin & Schneider 1973; Yarrow & Waxler 1974			**NORTH AMERICA** *Canada*: RS Mills et al. 1989
More in females				**ASIA** *Japan*: GD Wilson & Iwawaki 1980 **AFRICA** *Kenya*: Ember 1973:431 (rural) **EUROPE** *Britain*: Nias 1973 **NORTH AMERICA** *United States*: Skarin & Moely 1976; Leong & Tata 1990 (Chinese Americans); Zakriski et al. 2005	**NORTH AMERICA** *United States*: Herzog 1982 (self-report); Eisenberg et al. 1991	**ASIA** *India*: Kanekar & Merchant 2001 **NORTH AMERICA** *United States*: Simmons et al. 1977 (organ donations); Andreoni & Vesterlund 2001 (in a dictator game); TL Thompson et al. 2003 (willingness to donate organs after death); Becker & Eagly 2004 (donating more often to charities & becoming Peace Corp volunteers more)	**ASIA** *Hong Kong*: Ma 1985* **EUROPE** *Britain*: Ma 1985*

9.2.1.2. Attending to Others in General

Several studies have examined gender differences in giving attention to the needs of others. As shown in Table 9.2.1.2, the majority of these studies have indicated that females are more attentive than males.

Table 9.2.1.2. Attending to others in general.

Nature of Any Dif-ference					Postpubertal		Multiple Age Categories
						Adult	
Males more attentive						**ASIA** *Taiwan*: Lin et al. 2003	
No signif. difference							
Females more attentive						**NORTH AMERICA** *United States*: J Wood 1994	**NORTH AMERICA** *United States*: Okin 1989; Ruddick 1989; Siemer & Brown 1992 (animal rehabilitation); George et al. 1998

9.2.1.3. Helping Behavior

Many studies have sought to determine if gender differences exist in the tendency to be helpful to others. The methodologies employed in these investigations have involved researchers posing as strangers needing directions to experimentally contrived fights and watching to see who is most likely to intervene. As one can see by examining Table 9.2.1.3a, no consistent pattern is discernable with respect to subadolescents.

Split-Table 9.2.1.3a. Helping behavior (prepubertal).

Nature of Any Dif-ference	Prepubertal					
		Toddler	Early Childhood	Childhood		
Males more						
No signif. differ-ence			**LATIN AMERICA** *Mexico*: S Kagan & Madsen 1972 **NORTH AMERICA** *United States*: Stith & Connor 1962; Kagan & Madsen 1972*			
Females more		**NORTH AMERICA** *United States*: Zahn-Waxler et al. 1992 (comforting those who suffer)		**EUROPE** *Netherlands*: Meerum Terwogt 2002 **NORTH AMERICA** *Canada*: Cote et al. 2002a*:614 (helpful in general); Cote et al. 2002a*1089 (helpful to parents)		

In the case of adolescents and adults, Split-Table 9.2.1.3b also fails to reveal any consistent tendency for either sex to exhibit greater helping behavior than the other. The most likely main explanation for the inconsistencies involved details surrounding the exact types of situations for which help was offered (although age may also be involved). For example, as a general pattern, males seemed to offer greater assistance than females did in situations when providing help risked injury, whereas most of the circumstances under which females seemed most prone to help others were in terms of providing care and comfort with little risk of injury to the helper.

Split-Table 9.2.1.3b. Helping behavior (postpubertal).

Nature of Any Difference	Postpubertal
	Adult
Males more	**EUROPE** *Germany*: J Smith & Baltes 1998 (elderly, providing instrumental support) **NORTH AMERICA** *United States*: Hook 1943 (field); Thomas 1943 (field); Kerenyi 1960 (field); Schopler & Bateson 1965 (young, lab); Darley & Latane 1968 (young, lab); Piliavin et al. 1969 (field); Latane 1970 (field); Schwartz & Clausen 1970 (field); Borofsky et al. 1971 (young, lab); Emswiller et al. 1971 (field); Gaertner & Bickerman 1971 (field); Rudestam et al. 1971 (young, field); Wispe & Freshley 1971 (field); Moss & Page 1972 (field); Piliavin & Piliavin 1972 (field); Dutton & Lake 1973 (young, field); Gaertner 1973 (field); Gelfand et al. 1973 (field); Harris & Bays 1973 (field); Morgan 1973 (field); Pomazal & Clore 1973 (field); Bickman 1974* (young, lab); Blevins & Murphy 1974 (field); Harris et al. 1975 (field); Karabenick et al. 1975 (field); Konecni & Ebbesen 1975 (field); Latane & Dabbs 1975 (field); Piliavin et al. 1975 (field); Shaffer et al. 1975* (young, field); West et al. 1975 (field); Benson et al. 1976 (field); Isen et al. 1976 (field); Samerotte & Harris 1976 (field); Kleinke 1977 (field); Lindskold et al. 1977 (young, field); Pomazal 1977 (field); Solomon & Herman 1977 (field); Wispe et al. 1977 (field); Baker & Reitz 1978 (field); Beaman et al. 1978 (young, field); Begin 1978 (young, field); Benson & Catt 1978 (field); Cunningham 1978 (field); Feinman 1978 (field); Kleinke et al. 1978 (field); Seaman 1979 (field); Senneker 1979 (young, lab); Shotland & Huston 1979 (young, field); Shotland & Stebbins 1980 (young, field); Schwarz et al. 1980 (field); Barnett et al. 1981 (field); Goldman et al. 1981 (field); Jackson & Latane 1981 (field)
No signif. difference	**NORTH AMERICA** *United States*: Gruder & Cook 1971 (young, lab); Simon 1971 (field); Harris et al. 1973* (field); Harris & Huang 1973 (young, lab); Thayer 1973 (field); Bickman 1974* (young, lab); Levin & Isen 1975 (field); Shaffer et al. 1975* (field); Bloom & Clark 1976 (field); Shotland & Straw 1976 (young, lab); Levitt & Kornhaber 1977 (field); Weyant & Clark 1977 (field); Zuckerman & Reis 1978 (field); Foss & Dempsey 1979 (field); Solanch 1979* (young, lab); Valentine & Ehrlichman 1979 (field)
Females more	**NORTH AMERICA** *United States*: Thalholfer 1971 (young & middle age, lab); Deaux 1972 (field); Levy et al. 1972 (young, lab); Harris et al. 1973* (field); Bickman 1974* (young, lab); Dertke et al. 1974 (field); Lerner & Frank 1974 (field); Pandey & Griffitt 1974 (young, lab); Fink et al. 1975 (field); Wilson & Kahn 1975 (young, lab); RA Baron & Bel 1976 (field); Bleda et al. 1976 (young, lab); Pandey & Griffitt 1977 (young, lab); Schwartz & Ames 1977 (field); Foss & Crenshaw 1978 (field); Zinser & Farra 1978 (young, lab); Bihm et al. 1979 (field); Cunningham 1979 (field); Eisenberg-Berg 1979 (young, friends); Leftgoff-Sechooler 1979 (young, lab); Solanch 1979* (young & middle age, lab); Harrell & Goltz 1980 (field); Slochower et al. 1980 (field); Bernard 1981 (field); Boice & Goldman 1981 (field); Johnson & Aries 1983 (young and full, friends); Berg 1984 (young, friends); Vaux 1985* (among friends); Bridges 1989; JT Spence & Buckner 2000:50 (self-rated) **OCEANIA** *Australia*: Hong & Grambower 1986 (college)

9.2.1.4. Sharing Behavior

A couple of studies involving contrived psychological experiments concluded that females were more likely than males to share things they had recently acquired (Table 9.2.1.4).

Table 9.2.1.4. Sharing behavior.

Nature of Any Difference	Prepubertal	Postpubertal
	Early Childhood	Adult
Males more		
No signif. difference		
Females more	**NORTH AMERICA** *United States*: Wasik et al. 1969	**NORTH AMERICA** *United States*: Mikula 1974 (young, sharing winnings in an experiment)

9.2.1.5. Distributing Rewards Equitably

A couple of studies have involved human subjects in experiments in which they have the option of either distributing rewards equitably among their fellow subjects or according to such factors as the degree of effort or cooperation. According to both studies, males were more prone to distribute rewards equitably than were females (Table 9.2.1.5).

Table 9.2.1.5. Distributing rewards equitably.

Nature of Any Difference	Prepubertal
	Early Childhood
Males more	**NORTH AMERICA** *United States*: MA Barhett & Andrews 1977; Charlesworth & Dzur 1987 (same-sex groups)
No signif. difference	
Females more	

9.2.1.6. Being an Organ or Blood Donor

Several studies have concluded that males are more likely than females to volunteer as organ or blood donors (Table 9.2.1.6).

Table 9.2.1.6. Being an organ or blood donor.

Nature of Any Difference	Postpubertal
	Adult
Males more	**NORTH AMERICA** *United States*: Manninen & Evans 1985 (organ); MA Park 1998 (organ, Blacks); Yuen & Burton 1998 (organ); McNamara et al. 1999 (organ); Wu et al. 2001 (blood); Boulware et al. 2002:91
No signif. difference	
Females more	

9.2.2. Seeking or Receiving Help From Others

Below are tables summarizing findings on how males and females compare in terms of their help seeking behavior.

9.2.2.1 Seeking/Receiving Support From Others in General

Research concerned with gender differences in the tendency to obtain support from others is usually based on self-reports either from the recipients or from those providing the support. This research indicates that females are more likely to obtain social support than are males except in the case of adults with serious physical illness, where the opposite pattern frequently occurs (Table 9.2.2.1).

Table 9.2.2.1. Seeking/receiving support from others in general.

Nature of Any Difference	Prepubertal	Postpubertal	
	Childhood	Adolescent	Adult
Males receive more support			**NORTH AMERICA** *Canada*: Aish 1996 (social support following heart attack); *United States*: Stokes & Wilson 1984*; GA Hamilton & Seidman 1993 (social support following a heart attack); RF Young & Kahana 1993 (social support after heart attack); DA Olson & Shultz 1994* (social support, employed workers); Hildingh et al. 1997 (elderly, spousal support after heart attack); Mendes de Leon et al. 2001 (social support after heart attack)
No signif. difference			**ASIA** *Japan*: Furukawa et al. 1999 (psychiatric patients, self perceived) **NORTH AMERICA** *United States*: Fusilier et al. 1986; JR Turner & Noh 1988 (persons with disabilities); Conn et al. 1991 (social support after heart attack); JR Turner & Marino 1994 (rated by spouse)
Females receive more support	**NORTH AMERICA** *United States*: JH Larson et al. 1994:83 (career choice & development)	**ASIA** *Japan*: Takakura & Sakihara 2001 **NORTH AMERICA** *United States*: O'Hare & Buetell 1987(career choice & development); Frydenberg & Lewis 1991; Zani et al. 2001 (rated by friends)	**EUROPE** *Britain*: DB O'Connor et al. 2003:213 (college, in times of stress); *Germany*: J Smith & Baltes 1998 (elderly) **NORTH AMERICA** *Canada*: Bonin et al. 2000:155; *United States*: Bickman 1974 (requesters were college students; requestees were both sexes); Billings & Moos 1981; AG Billings & Moos 1984 (depressed patients); Stokes & Wilson 1984* (emotional support); Depner & Ingersoll-Dayton 1988 (elderly, rated by offspring & friends); Zimet et al. 1988 (recipient perceived & rated by friends); CE Ross & Mirowsky 1989 (recipient perceived); Barbee et al. 1990; Ashton & Fuehrer 1993 (emotional support); Barbee et al. 1993; Derlega 1994; DA Olson & Shultz 1994* (social support, college); JR Turner & Marino 1994 (recipient perceived & rated by friends); Liebler & Sandefur 2002; Prezza & Pacilli 2002 (rated by friends)

9.2.2.2. Help Seeking When Confronted With Novel Tasks

The available research on gender differences in seeking help when facing some sort of unfamiliar task has consistently concluded that females are more likely to do so than males (Table 9.2.2.2).

Table 9.2.2.2. Help seeking when confronted with novel tasks.

Nature of Any Difference	Prepubertal		Postpubertal
	Early Childhood	Childhood	Adolescent
Males more			
No signif. difference			
Females more	**EUROPE** *Scotland*: RB Thompson 1999	**NORTH AMERICA** *United States*: Nelson-LeGall & Glor-Scheib 1985	**EUROPE** *Sweden*: Gadin & Hammarstrom 2000 (females ask teachers for help more often)

9.2.2.3. Help Seeking When Interpersonal Disputes Arise

A few studies have compared the sexes in terms of help seeking behavior when disputes arise between themselves and peers. As shown in Table 9.2.2.3, girls have been shown to be more likely than boys to seek the help of a third party (usually an adult).

Table 9.2.2.3. Help seeking when interpersonal disputes arise.

Nature of Any Difference	Prepubertal	
	Early Childhood	Childhood
Males more		
No signif. difference		
Females more	**NORTH AMERICA** *United States*: McCandless et al. 1961	**AFRICA** *South Africa*: Draper 1976 (!Kung tribe) **NORTH AMERICA** *United States*: Freedman 1980 **INTERNATIONAL** *Multiple Countries*: Whiting & Edwards 1973

9.2.2.4. Obtaining Support From Others in Job Searches

Table 19.2.2.4 indicates that males are more likely than females to seek and/or obtain specific job tips and leads.

Table 9.2.2.4. Obtaining support from others in job searches.

Nature of Any Difference	Multiple Age Categories
Males receive more	**NORTH AMERICA** *United States*: Beggs & Hurlbert 1997 (job leads); Drentea 1998 (job leads); Straits 1998 (personal contacts in job searches); Mau & Kopischke 2001 (personal contacts in job searches); Huffman & Torres 2002 (job leads and personal contacts)
No signif. difference	
Females receive more	

9.3

NONLINGUSTIC COMMUNICATION OR COMMUNICATION IN GENERAL

Nonlinguistic communication comes in the form of such gestures as facial expressions, voice inflections, and body postures.

9.3.1. Nonlinguistic Communication

The most obvious forms of communication involve the use of language. In the section below, however, attention is given to findings of sex differences in communication that is of a nonlinguistic nature.

9.3.1.1. Correctly Interpreting Nonlinguistic Communication in General

Several studies have sought to determine which sex is better at decoding non-verbal face-to-face communication. As shown in Table 9.3.1.1, the conclusion reached by all of the found studies has been that females surpass males in these abilities. This conclusion coincides with at least two prior reviews (JA Hall 1978; McClure 2000).

Table 9.3.1.1. Correctly interpreting nonlinguistic communication in general.

Nature of Any Difference	Prepubertal				Postpubertal		Multiple Age Categories
				Childhood		Adult	
Males more							
No signif. difference							
Females more				**NORTH AMERICA** *United States*: Dimitrovsky 1964; Rosenthal et al. 1979*; Thorne 1993; J Parker 1999		**EUROPE** *Britain*: Kleck & Nuessle 1968 (females pay more attention to nonverbal cues in conversation) **NORTH AMERICA** *United States*: Dusenbury & Knower 1939 (young); Fay & Middleton 1941 (young); Pfaff 1954 (young); PK Levy 1964 (college, facial expressions of emotion); MZ Zuckerman et al. 1975 (college, facial expressions of emotions); De Paulo et al. 1978 (females pay more attention to nonverbal cues in conversations); Rosenthal et al. 1979*; Fujita et al. 1980 (decoding posed, but not spontaneous emotional expressions of others); D Gallagher & Shuntick 1981 (college, facial expressions of emotions); Rotter & Rotter 1988 (college)	**NORTH AMERICA** *United States*: Kirouac & Dore 1985; Howicki & Hartigan 1988;Mufson & Nowicki 1991 (decoding gestures); Gur et al. 1992 (facial expressions)

9.3.1.2. Gazing at Others

The available research indicates that females gaze at others longer than do males, although one study suggested that the number of gaze instances was actually greater for males (Table 9.3.1.2).

Table 9.3.1.2. Gazing at others.

Nature of Any Difference					Postpubertal	
						Adult
Males more						**NORTH AMERICA** *United States*: Bente et al. 1998:53* (number of gaze incidences)
No signif. difference						
Females more						**NORTH AMERICA** *United States*: Aiello 1972 (time spent gazing); Bente et al. 1998:53* (length of gaze)

9.3.1.3. Making Eye Contact With Others

A limited amount of research has indicated that females are more likely than males to make eye contact with others (Table 9.3.1.3).

Table 9.3.1.3. Making eye contact with others.

Nature of Any Difference	Prepubertal				Postpubertal	
	Infant					Adult
Males more						
No signif. difference						
Females more	**NORTH AMERICA** *United States*: D Silverman 1987 (with mothers)					**NORTH AMERICA** *United States*: Exline et al. 1965; Libby & Yaklevich 1973

9.3.1.4. Hand Shaking

Males are more likely to shake the hand of another same-sex person than are females, according to the available studies (Table 9.3.1.4).

Table 9.3.1.4. Hand shaking.

Nature of Any Difference					Postpubertal	
						Adult
Males more						**NORTH AMERICA** *United States*: Kendon & Ferber 1973 (same-sex); Greenbaum & Rosenfeld 1980 (same-sex); Heslen & Boss 1980 (same-sex); Riggio et al. 1981 (same-sex)
No signif. difference						
Females more						

9.3.1.5. Leaning Forward During Conversations

Males are more likely to lean forward during conversations, according to the available studies (Table 9.3.1.5).

Table 9.3.1.5. Leaning forward during conversations.

Nature of Any Difference						Postpubertal
						Adult
Males more						**NORTH AMERICA** *United States*: JA Hall 1985; Guerrero 1997
No signif. difference						
Females more						

9.3.1.6a. Smiling Behavior (Prepubertal)

While smiling can be considered a type of emotional expression (covered in Chapter 4), in this book, the behavior is treated as a social gesture (and therefore covered in the present chapter). This decision was made in light of the fact that most smiles occur during social interactions (Hall 1998:157).

Due to the large number of studies on gender differences in smiling, the findings are presented in two split-tables, one for sub-adolescents and the other for adolescents and adults. Regarding prepubertals, one can see from viewing Split-Table 9.3.1.6a that even very early in life, there appears to be a tendency for females to smile more than males.

Split-Table 9.3.1.6a. Smiling behavior (prepubertals).

Nature of Any Difference	Prepubertal			
	Infant	Toddler	Early Childhood	Childhood
Males more	**NORTH AMERICA** *United States*: Lasky & Klein 1979 (when in presence of mothers) **INTERNATIONAL** *Multiple Countries*: Kagan et al. 1994			
No signif. difference	**NORTH AMERICA** *United States*: Nagy et al. 2001		**LATIN AMERICA** *Brazil*: Otto & Sarra 1990 (in interpersonal interactions); Otta 1998:910* (in photos)	**NORTH AMERICA** *United States*: Stern & Bender 1974; B Lott 1978; DK Dodd et al. 1999* (in photos)
Females more	**NORTH AMERICA** *United States*: HA Moss 1967:22; Korner 1969 (during sleep); Korner 1969; Freedman 1974; DG Freedman 1979:175 (Blacks); Feldman et al. 1980; Cossette et al. 1996	**NORTH AMERICA** *United States*: R Justin 1932	**NORTH AMERICA** *United States*: Ding & Jersild 1932 (Chinese ancestry)	**ASIA** *Japan*: MH Bond and Ho 1978 (in interview) **LATIN AMERICA** *Brazil*: Otta 1998:910* (in photos) **NORTH AMERICA** *United States*: Mc Adams et al. 1984 (in interpersonal interactions); PM Cole 1985 (displaying "positive" emotions when given a disappointing gift); Halberstadt et al. 1988 (in interpersonal interactions); JA Hall et al. 1994 (in interpersonal interactions); C Johnson 1994 (in interpersonal interactions)

9.3.1.6b. Smiling Behavior (Postpubertal)

In the case of postpubertals, Split-Table 9.3.1.4b brings one to the same conclusion as in the case of its companion predecessor: Throughout the world, females appear to smile more than males. According to a study by LaFrance et al. 2003, the generalization may be made that females smile more. A recent meta-analysis of over 200 studies came to essentially the same conclusion: "Women and adolescent girls reliably smile more than men and adolescent boys," with an effect size of d = .41 (LaFrance et al. 2003). Not all of the studies covered by this meta-analysis were formally published and the findings from some of the others could not be confirmed, which means that they are not presented in Split-Table 9.3.1.4b. Nevertheless, the similarity of the conclusions is striking.

Split-Table 9.3.1.6b. Smiling behavior (postpubertal).

Nature of Any Difference	Postpubertal		Multiple Age Categories
	Adolescent	Adults	
Males more			
No signif. difference		**NORTH AMERICA** *United States*: Rosenfeld 1966; Mehrabian 1971a; Mehrabian 1971b; Jorgenson 1978; Tidd & Lockard 1978; Brennan-Parks et al. 1991:381 (young); JA Hall & Halberstadt 1986 (non-social settings); Fridlund 1991 (college); JA Harrigan & O'Connell 1996 (college, in interpersonal interactions); Guerrero 1997* (romantic interactions); Cashdan 1998 (college)	**OCEANIA** *Australia*: DG Freedman 1979:178* (Aboriginals)
Females more	**LATIN AMERICA** *Brazil*: Otta 1998:910 (in photos)* **NORTH AMERICA** *United States*: Morse 1982 (photo); JM Regan 1982 (in photos); PW Berman & Smith 1984 (in personal interactions); J Mills 1984 (in photos); Kolaric & Galambos 1995 (in interpersonal interactions); Chapell 1997 (in interpersonal interactions); DK Dodd et al. 1999* (in photos)	**ASIA** *Japan*: MH Bond & Shiraishi 1974; MH Bond & Ho 1978 (in interpersonal interactions); Wada 1989 (in interpersonal interactions) **EUROPE** *Germany*: Brosius et al. 1991* (in photos); *Italy*: Ricci Bitti et al. 1974 (in photos); *Netherlands*: Vrugt & Kerkstra 1984 (in photos); Vrugt & vanEechoud 2002:426 (college, in personal interactions) **LATIN AMERICA** *Brazil*: Otta 1998:910* (in photos); *Mexico*: Korzenny et al. 1985 (self-report) **NORTH AMERICA** *United States*: Sarason & Winkel 1966; Beekman 1970 (young); Bugental et al. 1971 (college); Chaikin et al. 1974; McClintock & Hunt 1975 (in interpersonal interactions); Deaux 1976 (college); DG Freedman 1976:52* (college, in photos); Mackey 1976 (young); Henley 1977 (toward opposite sex); Chaikin & Derlega 1978; Chaiken 1979 (young); SJ Frances 1979 (college); Ickes et al. 1979; LaFrance & Carmen 1980 (college); M Davis & Weitz 1981; C Morse 1982 (college, in photos); JM Regan 1982 (college, in photos); Ickes & Turner 1983 (toward opposite sex); Kennedy & Camden 1983; McAdams et al. 1984 (in interpersonal interactions): J Mills 1984 (college, in photos); J Hall & Halberstadt 1986 (in interpersonal interactions, college); Halberstadt & Saitta 1987 (in personal interactions, college); Dovidio et al. 1988 (in interpersonal interactions); Halberstadt et al. 1988 (college, in interpersonal interactions); Brownlow & Zebrowitz 1990 (in photos); Deutsch 1990 (college, in interpersonal interactions); Brennan-Parks et al. 1991 (young, in photos); Hinsz & Tomhove 1991 (college); NJ Briton & Hall 1995 (young); Van Vianen & van Schie 1995 (in personal interactions); Coats & Feldman 1996 (when happy); Coats & Feldman 1996 (when happy); Guerrero 1997* (general social interactions); Hecht & LaFrance 1998 (college, in personal interactions); Desantis et al. 1998 (young); Otta 1998 (in photos); DK Dodd et al. 1999* (young, in photos); DeSantis & Sierra 2000 (in photos); JA Hall et al. 2001 (in photos); JA Hall et al. 2002 (in photos) **OCEANIA** *Australia*: DG Freedman 1976:52* (college, in photos) **INTERNATIONAL** *Cross-Cultural*: Waxer 1985 (in photos); Choe et al. 1986 (in photos)	**NORTH AMERICA** *United States*: Mehrabian & Williams 1969; JH Block 1976 (in interpersonal interactions); Mackey 1976 (in interpersonal interactions); RM Adams & Kirkevold 1978 (in a restaurant); Hildebrandt & Fitzgerald 1978; DE Freedman 1979:176* (in interpersonal interactions); Kraut & Johnston 1979; Hall 1984; Hall & Halberstadt 1986; Halberstadt et al. 1988 (in interpersonal interactions)

9.3.1.7. Friendly/Polite/Respectful Nonlinguistic Communication

Two studies of friendly, polite, and respectful nonlinguistic gestures concluded that they were emitted by females more than by males under comparable circumstances (Table 9.3.1.7).

Table 9.3.2.7. Friendly/polite/respectful nonlinguistic communication.

Nature of Any Difference	Postpubertal
	Adult
Males more	
No signif. difference	
Females more	**ASIA** *Japan*: JS Smith 1992 (polite, in speech); Otto et al. 1996 (polite)

9.3.2. Unfriendly and Deceitful Communication

Behavior that seems to have as its objective to be the opposite of helpful to others is given attention in the subsection below.

9.3.2.1. Unfriendly Nonverbal Communication

Exhibiting unfriendly nonverbal behavior toward others (such as threatening gestures) has been found to be more common among males than among females (Table 9.3.2.1).

Table 9.3.2.1. Unfriendly nonverbal communication.

Nature of Any Difference	Prepubertal		Multiple Age Categories
	Early Childhood	Childhood	
Males more	**NORTH AMERICA** *United States*: Killen & Naigles 1995 (threats)	**NORTH AMERICA** *United States*: Kyratzis 1992 (young, threats); Hartup et al. 1993 (threats)	**ASIA** *Japan*: Cocroft & Ting-Toomey 1994* (face-threatening behavior) **NORTH AMERICA** *United States*: Cocroft & Ting-Toomey 1994* (face-threatening behavior) **PRIMATE (EXCEPT APE)** *Multiple Species*: Harlow & Rosenblum 1971
No signif. difference			
Females more		**MARSUPIAL** *Gray Short-tailed Opossum*: BH Fadem & Corbett 1997 (threatening behaviors)	

9.3.2.2. Lying, Deception, and Dishonesty

Studies have reached inconsistent conclusions regarding which sex is more likely to be dishonest and deceiptful under various conditions (Table 9.3.2.2).

Table 9.3.2.2. Lying, deception, and dishonesty.

Nature of Any Difference	Prepubertal	Multiple Age Categories
	Childhood	
Males more		**NORTH AMERICA** *United States*: Wiederman 1997 (exaggerating the number of sex partners they have had)
No signif. difference	**NORTH AMERICA** *United States*: Terman et al. 1925; V Jones 1936; Rie 1963 (lie detector, anxiety test)	**NORTH AMERICA** *United States*: Terman et al. 1925; V Jones 1936
Females more	**NORTH AMERICA** *United States*: Hartshorne & May 1928	

9.3.2.3. Dishonesty About Weight

A few studies have sought to determine if there is a sex difference in the tendency to mis-report ones weight (usually in terms of providing under-estimates). As shown in Table 9.3.2.3, the results have consistently shown that females do so more than males.

Table 9.3.2.3. Dishonesty about weight.

Nature of Any Difference	Postpubertal
	Adult
Males more	
No signif. difference	
Females more	**NORTH AMERICA** *United States*: RR Wing et al. 1979; Pirie et al. 1981; NE Betz et al. 1994; JR Shapiro & Anderson 2003 (college)

9.3.2.4. "Lie Scale" Score

The "lie scale" is designed to detect people's tendencies to provide misleading information in socially desirable directions on a questionnaire or interview (MR Dadds et al. 1998:312). The most widely used version of such a scale is contained in the Eysenck Personality Inventory. Table 9.3.2.4 indicates that findings have been very inconsistent with respect to any sex difference.

Table 9.3.2.4. "Lie scale" score.

Nature of Any Difference	Prepubertal	Postpubertal	
	Childhood	Adolescent	Adult
Males higher	**NORTH AMERICA** *United States*: Castaneda & McCandkess 1956 (Eysenck scale); MR Dadds et al. 1998*		**NORTH AMERICA** *United States*: Thiessen & Ross 1990:301 (college)
No signif. difference		**NORTH AMERICA** *United States*: MR Dadds et al. 1998*	**NORTH AMERICA** *Canada*: JD Parker et al. 1989:601 (young)
Females higher		**EUROPE** *Britain*: DL Smith 1996:1063; *Netherlands*: Sanderman et al. 1991 (lie scale of EPI)	**EUROPE** *Britain*: Willmott & Brierley 1984 (Eysenck scale); SB Eysenck et al. 1993 (young) **NORTH AMERICA** *Canada*: SB Eysenck et al. 1993 (young)

9.3.2.5. Cheating

Most studies of cheating on tests or in experimental games have concluded that there is either no sex difference or that males are more likely to cheat than are females (Table 9.3.2.5). This conclusion is moderately supportive of a meta-analysis by Whitley et al. (1999) which concluded that males were at least slightly more likely to cheat than females.

Table 9.3.2.5. Cheating.

Nature of Any Difference	Sub Adolescent	Postpubertal	
	Childhood	Adolescent	Adult
Males more		**NORTH AMERICA** *United States*: Rebelsky et al. 1963 (experimental game)	**ASIA** *Russia*: Poltorak 1995:236 (college) **NORTH AMERICA** *United States*: WJ Bowers 1964 (young); Faulkner & de Jong 1966:41 (college); Fakouri 1972 (young); Baird 1980 (young); JS Baird 1980 (young); Newhouse 1982 (college, experimental game); DA Ward 1986 (young); Michaels & Miethe 1989 (young); Aiken 1991 (young); McCabe & Trevino 1993 (young); McCabe & Bowers 1996 (college); McCabe & Travino 1996:32 (in the 1960's); Newstead et al. 1996 (young)
No signif. difference			**NORTH AMERICA** *United States*: Karabenick & Srull 1978 (college, experimental game); JR Kelly & Worell 1978 (college, experimental game); JS Baird 1980* (college); Antion & Michall 1983 (college, experimental game); JP Houston 1983 (young); DR Forsyth et al. 1985 (young, experimental games); VJ Haines et al. 1986 (young); MK Covey et al. 1989 (young, experimental games); AR Perry et al. 1990 (college, experimental game); KM May & Loyd 1993 (young); McCabe & Travino 1996:32 (in the 1990's)
Females more	**NORTH AMERICA** *United States*: Hartshorne & May 1928 (self-reports)		**NORTH AMERICA** *United States*: LI Jacobson et al. 1970; MA Graham et al. 1994 (young)

9.3.2.6. Faking Happiness

According to two studies of children, females were more likely than males to pretend to be happy after having been told sad news (Table 9.3.2.6).

Table 9.3.2.6. Faking happiness.

Nature of Any Difference	Prepubertal	
	Early Childhood	Childhood
Males more		
No signif. difference		
Females more	**NORTH AMERICA** *United States*: P Cole 1986 (masking sadness or disappointment)	**NORTH AMERICA** *United States*: TL Davis 1995 (masking sadness or disappointment)

9.3.2.7. Detecting Deception

Studies of sex differences in the ability to detect deception generally suggest that males and females are equivalent (Table 9.3.2.7).

Table 9.3.2.7. Detecting deception.

Nature of Any Difference	Postpubertal
	Adult
Males more	
No signif. difference	**NORTH AMERICA** *United States*: Pfaff 1954; Feeley et al. 1995; Millar & Millar 1995; Vrij & Semin 1996
Females more	**NORTH AMERICA** *United States*: Kalbfleisch 1990

9.4
LINGUISTIC COMMUNICATION BEHAVIOR

The single most important and distinguishing characteristic of the human species is the ability to communicate with language. It is not surprising, therefore, that many scientific efforts have been undertaken to determine if males and females use their language capabilities differently to communicate. The findings are summarized below.

9.4.1. Type of Words and Sentences Used

Sex differences in the types of words used and sentences constructed are summarized in the following section.

9.4.1.1. Adopting an Opposite-Sex Conversational Style

Males and females exhibit subtle differences in how they converse. One study examined these differences during between-sex conversations and concluded that males shifted their conversational style more toward a female mode to a greater degree than females shifted their style to a male mode (Table 9.4.1.1).

Table 9.4.1.1. Adopting an opposite sex conversational style.

Nature of Any Difference	Postpubertal
	Adult
Males do so more	**NORTH AMERICA** *United States*: MA Fitzpatrick et al. 1995 (when conversing with their spouse)
No signif. difference	
Females do so more	

9.4.1.2. Length of Sentences (Number of Words in an Average Sentence)

As shown in Table 9.4.1.2, the majority of studies that have compared the number of words comprising the average sentence written or spoken have concluded that sentences of females tend to be longer than those of males.

Table 9.4.1.2. Length of sentences (number of words in an average sentence).

Nature of Any Difference			Postpubertal
	Early Childhood	Childhood	Adult
More in males		**NORTH AMERICA** *United States*: Mulac et al. 1990 (written essays)	
No signif. difference			
More in females	**NORTH AMERICA** *United States*: ME Smith 1926; DA McCarthy 1930	**NORTH AMERICA** *United States*: Hunt 1965 (written assignments); Poole 1979 (spoken discourse)	**NORTH AMERICA** *United States*: Mulac et al. 1986 (verbal discourse); Mulac & Lundell 1986 (verbal speech); Mulac & Lundell 1994 (written discourse); NS Baron 2004 (college students, length of instant messaging via internet)

9.4.1.3. Vocabulary, Extensiveness and Accuracy of

Studies of gender differences in the breadth of people's vocabularies have not reached consistent conclusions, although a slightly greater number of studies have favored females (Table 9.4.1.3).

Table 9.4.1.3. Vocabulary, extensiveness and accuracy of.

Nature of Any Difference	Prepubertal			Postpubertal		Multiple Age Categories
	Toddler	Early Childhood	Childhood	Adolescent	Adult	
Males higher		**NORTH AMERICA** *United States*: Hall 1891	**EUROPE** *Britain*: Dunsdon & Roberts 1955 **NORTH AMERICA** *United States*: Uhrbrock 1920*; J Roberts 1971:8 (during the 1960's); J Roberts 1972:6 (during the 1960's)	**NORTH AMERICA** *United States*: Uhrbrock 1920*; Miele 1958*; Scanlon 1973:6 (during the 1960's)		
No signif. difference	**NORTH AMERICA** *United States*: ME Smith 1926; T Moore 1967	**NORTH AMERICA** *United States*: Bryan 1934*	**NORTH AMERICA** *United States*: Byran 1934*; Schiller 1934; Gansl 1939; Miele 1958* **OCEANIA** *Australia*: McIntyre & Wood 1935	**NORTH AMERICA** *United States*: WW Clark 1959 (young); J Sherman 1979:387		
Females higher	**NORTH AMERICA** *United States*: D McCarthy 1930; Huttenlocher et al. 1991	**NORTH AMERICA** *United States*: Douglass 1925*	**NORTH AMERICA** *United States*: Douglass 1925*; Commins 1928 (literature); Conrad et al. 1933*; Fenson et al. 1994; JH Kramer et al. 1997	**EUROPE** *Netherlands*: Klinkenberg 1913 (literature) **NORTH AMERICA** *United States*: Carroll 1933* (literature); Driggs 1934; C McGuire 1954 (young)	**NORTH AMERICA** *United States*: Carroll 1933* (literature)	**NORTH AMERICA** *United States*: Conrad et al. 1933*

9.4.1.4. Swearing and Cursing

Numerous studies have sought to determine if males or females are more likely to use "coarse language" or "taboo words". Nearly all of these studies have concluded that males are more likely to do so than females (Table 9.4.1.4). The two exceptional studies involved mixed-sex, as opposed to same-sex, groups.

Table 9.4.1.4. Swearing and cursing.

Nature of Any Difference	Prepubertal	Postpubertal		Multiple Age Categories
	Childhood	Adolescent	Adult	
Males more	**NORTH AMERICA** *United States*: Abrahams 1962; Sutton-Smith & Abrams 1978; McCabe & Lipscomb 1988	**NORTH AMERICA** *United States*: Lerman 1968; Shuntich & Shapiro 1991	**LATIN AMERICA** *Mexico*: Bernard 1975*(young; Otomi Indians) **NORTH AMERICA** *United States*: Steadman 1935; Hunter & Gaines 1938; Joffe 1948; McGinnies 1949; Deveraux 1951* (young, Mohave Indians); Postman et al. 1953; Nothman 1962; Grosser & Laczek 1963; Grosser & Walsh 1966; Gilley & Summers 1970; Milner & Moses 1972; Foote & Woodward 1973; Kutner & Brogan 1974; Walsh & Leonard 1974; Mabry 1975; W Wilson 1975 (college); Halaby & Long 1979; JS Sanders & Robinson 1979 (college); De Klerk 1991; Murnen 2000 (college); Kinney et al. 2001 (college) **OCEANIA** *New Zealand*: Bayard & Krishnayya 2001* (same-sex)	**ASIA** *Japan*: Shibamoto 1985 (adolescent & adult); Shibamoto 1990 (adolescent & adult); JS Smith 1992 (adolescent & adult) **EUROPE** *Britain*: Jespersen 1922 **NORTH AMERICA** *United States*: Flexner 1960; Lowenstine et al. 1982 (in graffiti); Limbrick 1991* (same-sex groups) **OCEANIA** *New Zealand*: JA Green 2003 (in graffiti)
No signif. difference			**OCEANIA** *New Zealand*: Bayard & Krishnayya 2001*(mixed-sex)	**NORTH AMERICA** *United States*: Limbrick 1991*(mixed-sex)
Females more				

9.4.1.5. Telling Dirty Jokes

So-called dirty jokes usually involve topics having to do with sex acts or with eliminating bodily waste. As shown in Table 9.4.1.5, males appear to tell more of these jokes than do females.

Table 9.4.1.5. Telling dirty jokes.

Nature of Any Difference	Postpubertal
	Adult
Males more	**NORTH AMERICA** *United States*: Coser 1960; Chapman & Foot 1976; Chapman 1977; McGee 1979
No signif. difference	
Females more	

9.4.1.6. Beginning Sentences With Adverbial Clauses

Table 9.4.1.6 indicates that females are more likely than males to begin sentences with adverbial clauses.

Table 9.4.1.6. Beginning sentences with adverbial clauses.

Nature of Any Difference	Prepubertal				Postpubertal	
				Childhood		Adult
More in males						
No signif. difference						
More in females				**NORTH AMERICA** *United States*: Mulac et al. 1990 (written essays)		**NORTH AMERICA** *United States*: Mulac et al. 1986 (public speaking); Mulac et al. 1988 (dyadic interactions); Mulac & Lundell 1994 (written discourse)

9.4.1.7. Referring to Emotions (Using Emotion-Laden Words)

Nearly all studies that have sought to determine which sex is more likely to refer to emotions and feelings when conversing or writing have concluded that females do so more than males (Table 9.4.1.7).

Table 9.4.1.7. Referring to emotions (using emotion-laden words).

Nature of Any Difference	Prepubertal				Postpubertal	
		Toddler	Early Childhood	Childhood		Adult
More in males						**NORTH AMERICA** *United States*: Rubin & Greene 1992 (college, writing assignment)
No signif. difference						
More in females		**NORTH AMERICA** *United States*: Malatesta et al. 1989 (assessed by parents)	**NORTH AMERICA** *United States*: J Dunn et al. 1987 (assessed by parents)	**NORTH AMERICA** *United States*: Staley 1982 (oral descriptions of pictures); Botkin & Twardosz 1988 (assessed by teachers)		**NORTH AMERICA** *United States*: Balswick & Avertt 1977 (written responses to questions); Mulac et al. 1986 (public speeches); Brody 2001:56; Winn & Rubin 2001 (use more references to emotions in writing); NS Baron 2004* (college students, more emoticons in instant messages) **INTERNATIONAL** *Multiple Countries*: Scherer et al. 1986

9.4.1.8. Referring to Physical Locations

A couple of studies have indicated that males are more likely than females to refer to physical locations in their spoken sentences (Table 9.4.1.8).

Table 9.4.1.8. Referring to physical locations.

Nature of Any Difference					Postpubertal	
						Adult
More in males						**NORTH AMERICA** *United States*: Gleser et al. 1959 (oral descriptions of events); Mulac & Lundell 1986 (oral descriptions of objects)
No signif. difference						
More in females						

9.4.1.9. Referring to Specific Quantities

According to several studies, males are more likely than females to specify quantities of things being discussed (Table 9.4.1.9).

Table 9.4.1.9. Referring to specific quantities.

Nature of Any Difference	Prepubertal				Postpubertal	
				Childhood		Adult
Males more				**NORTH AMERICA** *United States*: Sause 1976 (oral interview)		**NORTH AMERICA** *United States*: Gleser et al. 1959 (oral conversation); MM Wood 1966 (spontaneous speech); Warshay 1972 (written essay); Mulac & Lundell 1986 (oral description of figures)
No signif. difference						
Females more						

9.4.1.10. Using Bold (Flamboyant) Phrasing

Bold and flamboyant phrasing can take on a variety of forms. The very limited research has not provided a consistent picture regarding any gender differences in such phrasing (Table 9.4.1.10).

Table 9.4.1.10. Using bold (flamboyant) phrasing.

Nature of Any Difference						Postpubertal
						Adult
More in males						**EUROPE** *Britain*: Francis et al. 2001
No signif. difference						
More in females						**NORTH AMERICA** *United States*: NS Baron 2004 (college students, more emoticons in instant messages)

9.4.1.11. Using Abbreviations and Acronyms

One study concluded that females used more abbreviations and acronyms when communicating electronically (Table 9.4.1.11).

Table 9.4.1.11. Using abbreviations and acronyms.

Nature of Any Difference						Postpubertal
						Adult
More in males						
No signif. difference						
More in females						**NORTH AMERICA** *United States*: NS Baron 2004 (college, abbreviations & acronyms in instant messages)

9.4.1.12. Using Correct Grammar

One study concluded that in written graffiti messages, those written in women's restroom facilities had better grammar than did those in men's restrooms (Table 9.4.1.12).

Table 9.4.1.12. Using correct grammar.

Nature of Any Difference							Multiple Age Categories
Males more							
No signif. difference							
Females more							**NORTH AMERICA** *United States*: Loewenstine et al. 1982 (in graffiti messages)

9.4.1.13. Using Tentative Language (Qualifiers and Hedging Words)

Quite a number of studies have compared the sexes with regard to the use of various qualifying and hedging words and phrases. Table 9.4.1.13 shows that nearly all of these studies have concluded that these tentative words and phrases are more common in the speech and writing of females than of males.

Table 9.4.1.13. Using tentative language (qualifiers and hedging words).

Nature of Any Difference					Postpubertal		Multiple Age Categories
					Adolescent	Adult	
More in males							
No signif. difference						**NORTH AMERICA** *United States*: Baumann 1976	
More in females					**NORTH AMERICA** *United States*: Mulac et al. 1990 (impromptu written essays); DL Rubin & Green 1992 (in writing qualifiers)	**NORTH AMERICA** *United States*: Lakoff 1973; Lakoff 1975 (in qualifiers); Swacker 1975; Hartman 1976; F Crosby & Nyquist 1977 (dyadic interactions); O'Barr 1982; Carli 1989 (psychology undergraduates); Womak 1987; Mulac 1989 (in qualifiers); Lakoff 1990 (in qualifiers); Carli et al. 1995 (psychology undergraduates); Mulac 1998 (in qualifiers) **OCEANIA** *Australia*: Reid et al. 2003 (undergraduates)	**NORTH AMERICA** *United States*: Hass & Wepman 1973 (early childhood through adolescence)

9.4.1.14. Using Intensifying Adverbs

Females have been found to use intensifying adverbs (such as *very* and *extremely*) to a greater degree than males (Table 9.4.1.14).

Table 9.4.1.14. Using intensifying adverbs.

Nature of Any Difference					Postpubertal	
					Adolescent	Adult
Males more						
No signif. difference						
Females more					**NORTH AMERICA** *United States*: Mulac et al. 1990 (written essays)	**NORTH AMERICA** *United States*: Crosby & Nyquist 1977 (dyadic interactions); Mc Millan et al. 1977 (group discussions); Lapadat & Seesahai 1978 (group discussions); Mulac & Lundell 1986 (oral descriptions of pictures); Mulac et al. 1986 (public speeches); Mulac et al. 1988 (dyadic interactions); Braduc et al. 1995 (communication students); MA Fiztpatrick et al. 1995; LH Turner et al. 1995 (dyadic interactions)

9.4.1.15. Using Words With References With Intentions to Influence Others

Some researchers have concluded that while socially interacting with others males are more likely than females to utter statements to the effect that the speaker is seeking to alter the behavior or opinions of others (Table 9.4.1.15).

Table 9.4.1.15. Using words with references with intensions to influence others.

Nature of the Relationship					Postpubertal		Multiple Age Categories
						Adult	
More in interacting with males						**NORTH AMERICA** *United States*: Ayers-Nachamkin et al. 1982 (young, threats & pledges to influence others); DeTurck & Miller 1982 (young, threats & pledges to influence others)	**NORTH AMERICA** *United States*: Kipnis et al. 1980 (threats & pledges to influence others)
No signif. difference							
More in interacting with females							

9.4.1.16. Using Judgmental Adjectives

The use of adjectives of a judgmental nature has been found to be more common among males than among females (Table 9.4.1.16).

Table 9.4.1.16. Using judgmental adjectives.

Nature of Any Difference	Prepubertal				Postpubertal	
				Childhood	Adolescent	Adult
Males more				**NORTH AMERICA** *United States*: Sause 1976 (writing)	**NORTH AMERICA** *United States*: Mulac et al. 1990 (written essays)	**NORTH AMERICA** *United States*: Mulac & Lundell 1994 (written descriptions of photos)
No signif. difference						
Females more						

9.4.1.17. Using Personal Pronouns

The evidence summarized in Table 9.4.1.17 provides a very mixed picture with regard to any sex difference in the use of personal pronouns.

Table 9.4.1.17. Using personal pronouns.

Nature of Any Difference	Prepubertal				Postpubertal	
				Childhood	Adolescent	Adult
Males more					**NORTH AMERICA** *United States*: Mulac et al. 1990 (impromptu essays)	**NORTH AMERICA** *United States*: Mulac & Lundell 1994 (written discourse)
No signif. difference						
Females more				**NORTH AMERICA** *United States*: Koenigsknecht & Friedman 1976 (verbal description of experiences); Haslett 1983 (written stories)		**NORTH AMERICA** *United States*: Gleser et al. 1959 (verbal conversation); Westmoreland et al. 1977 (college, authored news articles); Mulac & Lundell 1986 (oral description of photos); Mulac et al. 1988 (dyadic interactions); Argamon et al. 2003 (in writing)

9.4.1.18. Using Plural Pronouns

According to one study, males use plural pronouns (e.g., we, they) rather than singular pronouns (e.g., I, him/her) more often than do females (Table 9.4.1.18).

Table 9.4.1.18. Using plural pronouns.

Nature of Any Difference					Postpubertal	
						Adult
Males more						**NORTH AMERICA** *United States*: Argamon et al. 2003 (in writing)
No signif. difference						
Females more						

9.4.1.19. Using Progressive Verbs (Words Ending in *ing*)

The findings of studies of sex differences in the use of progressive verbs have not reached consistent conclusions (Table 9.4.1.19).

Table 9.4.1.19. Using progressive verbs (words ending in *ing*).

Nature of Any Difference	Prepubertal				Postpubertal	
				Childhood	Adolescent	Adult
Males more						**NORTH AMERICA** *United States*: Mulac et al. 1986 (public speaking)
No signif. difference						
Females more				**NORTH AMERICA** *United States*: Mulac & Lundell 1994 (impromptu talks)	**NORTH AMERICA** *United States*: Mulac et al. 1990 (impromptu written essays)	

9.4.1.20. Using Qualifying and Dependent Clauses

According to a limited number of studies, females surpass males in the use of qualifying and dependent clauses (Table 9.4.1.20).

Table 9.4.1.20. Using qualifying and dependent clauses.

Nature of Any Difference	Prepubertal				Postpubertal	
				Childhood		Adult
More in males						
No signif. difference						
More in females				**NORTH AMERICA** *United States*: KW Hunt 1965 (written essays); Poole 1979 (spoken discourse); Mulac et al. 1990 (impromptu talks)		**NORTH AMERICA** *United States*: R Beck 1978 (oral presentations); Mulac & Lundell 1994 (written discourse)

9.4.1.21. Using Verbs Indicating Uncertainty

A limited amount of research suggests that females more often use verbs indicating uncertainty than are males (Table 9.4.1.21).

Table 9.4.1.21. Using verbs indicating uncertainty.

Nature of Any Difference	Prepubertal				Postpubertal	
				Childhood		Adult
More in males						
No signif. difference						
More in females				**NORTH AMERICA** *United States*: Mulac & Lundell 1994 (impromptu talks)		**NORTH AMERICA** *United States*: Hartman 1976 (interviews); Poole 1979 (interviews); Carli 1990 (psychology undergraduates)

9.4.1.22. Using Self-Derogatory Remarks

One study concluded that women made more self-derogatory remarks than did males (Table 9.4.1.22).

Table 9.4.1.22. Using self-derogatory remarks.

Nature of Any Difference	Postpubertal
	Adult
Males more	
No signif. difference	
Females more	**NORTH AMERICA** *United States*: R Thomsom et al. 2001:173 (internet conversations)

9.4.1.23. Writing Graffiti in General

Graffiti refers to writing that most often appears in toilet stalls or on the walls of subways and underpasses. All of the studies located pertained to toilet stall messages. Since most studies of graffiti are not based on direct observation of the writing taking place or on the basis of self-reports, the age of the writers is generally inferred. For example, in all likelihood, graffiti in high school restrooms were written by teenagers, whereas restrooms in universities or in bars frequented by college students were most likely written by these students. It is on these bases that the age groupings are presented. To control for any sex differences in the frequency of restroom usage, some studies have counters for the number of times stall doors are being open and closed, while other studies divide the messages written by the number of rolls of toilet paper used (Buser & Ferreira 1980).

Table 9.4.1.23 indicates that findings have been mixed with respect to indicating significant gender differences in the writing of graffiti messages on restroom walls.

Table 9.4.1.23. Writing graffiti in general.

Nature of Any Difference	Postpubertal		Multiple Age Categories
	Adolescent	Adult	
Male more	**NORTH AMERICA** *United States*: Peretti et al. 1977	**NORTH AMERICA** *United States*: Sechrest & Flores 1969* (college); Schreer & Strichartz 1997 (college) **OCEANIA** *Philippines*: Sechrest & Flores 1969* (college)	**NORTH AMERICA** *United States*: Otta 1993
No signif. difference			
Female more	**NORTH AMERICA** *Canada*: Ahmed 1981; *United States*: Wales & Brewer 1976	**NORTH AMERICA** *United States*: Stocker et al. 1972 (college)	

9.4.1.24. Writing Graffiti Specifically on Political Topics

A few studies of graffiti have sought to determine if males or females are more likely to write on political topics. As shown in Table 9.4.1.24, these studies have reached inconsistent conclusions.

Table 9.4.1.24. Writing graffiti specifically on political topics.

Nature of Any Difference	Postpubertal	Multiple Age Categories
	Adult	
Male more		**NORTH AMERICA** *United States*: Loewenstine et al. 1982; Otta et al. 1996
No significant difference		**NORTH AMERICA** *United States*: Otta 1993
Female more	**NORTH AMERICA** *United States*: Schreer & Strichartz 1997 (college)	

9.4.1.25. Writing Graffiti Specifically on Sexual Topics

Studies of gender differences in the proportion of graffiti written on various sexual (excluding romantic) topics have provided mixed results (Table 9.4.1.25).

Table 9.4.1.25. Writing graffiti specifically on sexual topics.

Nature of Any Difference	Postpubertal	Multiple Age Categories
	Adult	
Male more	**NORTH AMERICA** *United States*: Schreer & Strachartz 1997 (college)	
No signif. difference		**NORTH AMERICA** *United States*: Otta et al. 1996
Female more		**NORTH AMERICA** *United States*: Bates & Martin 1980

9.4.1.26. Writing Graffiti Specifically on Romantic Topics

One study concluded that graffiti with a romantic theme is more common in locations frequented by females than by males (Table 9.4.1.26).

Table 9.4.1.26. Writing graffiti specifically on romantic topics.

Nature of Any Difference	Multiple Age Categories
Males more	
No signif. difference	
Females more	**NORTH AMERICA** *United States*: Loewenstine et al. 1982:308

9.4.2. Types of Communication

Communication is at the heart of what drives human culture. Findings from studies of sex differences in communication are summarized below.

9.4.2.1. Nonlinguistic Vocalizations

A few studies have recorded the extent to which males and females simply vocalize (babble) without yet actually speaking words. As shown in Table 9.4.2.1, these studies, one of which even involved a nonhuman primate species, have concluded that females do so more than do males of the same age.

Table 9.4.2.1. Nonlinguistic vocalizations.

Nature of Any Difference	Prepubertal	
	Infant	Toddler
Males more		
No signif. difference		
Females more	**NORTH AMERICA** *United States*: Gatewood & Weiss 1930 (newborn); Fagot et al. 1985 **PRIMATE (EXCEPT APE)** *Vervet Monkey*: Locke & Hauser 1999	**NORTH AMERICA** *United States*: S Goldberg & Lewis 1969; SB Messer & Lewis 1972:301

9.4.2.2. Linguistic Communication in General, Extensiveness of

Studies have been undertaken to determine which gender talks most in social circumstances. As shown in Table 9.4.2.2, the findings vary, depending primarily on whether the talking is taking place in large gatherings, such at arranged business meetings, or in informal groups or just one or two friends. The table suggests that there may be a tendency for females to converse more in relatively informal two- or three-person groups, whereas males speak more in large groups, especially when gatherings were formally arranged. Another factor that makes this particular table difficult to interpret is that it does not distinguish the sex of the other group members. Overall, despite Leaper and Smith's (2004) conclusion from a meta-analysis that females are more talkative than males at least prior to adulthood, Table 9.4.2.2 does not easily lend itself to any clear gender differentiation regarding the extensiveness of linguistic communication.

Table 9.4.2.2. Linguistic communication in general, extensiveness of.

Nature of Any Difference	Prepubertal			Postpubertal		Multiple Age Categories
	Toddler	Early Childhood	Childhood	Adolescent	Adult	
Males more	**NORTH AMERICA** *United States*: Cook et al. 1985	**EUROPE** *Britain*: Turner 1991 **NORTH AMERICA** *United States*: Mueller 1972 (total number of words); Pellegrini & Perlmutler 1988 (total number of words)	**EUROPE** *Spain*: Ramirez & Mendoza 1984 (total number of words)	**NORTH AMERICA** *United States*: Brophy & Good 1974 (talkative in class); Swacker 1975 (in formal settings)	**NORTH AMERICA** *United States*: DW Carment et al. 1964 (college, spoke more in class, introduction to psychology); DeFrancisco 1991 (among married couples); Athenstaedt et al. 2004	**NORTH AMERICA** *United States*: Swacker 1979 (in formal settings)
No signif. difference	**NORTH AMERICA** *Canada*: Dunham et al. 1991; *United States*: Garvey & BenDebba 1974; Cherry & Lewis 1976; Smith & Daglish 1977; Haas 1981; Stuckey et al. 1982; Liss 1983; Miller et al. 1985 (duration of speech); DeLoache & DeMendoza 1987; Blakemore 1990; Dunn et al. 1991; Black & Logan 1995; Killen & Naigles 1995; Leaper et al. 1995	**NORTH AMERICA** *Canada*: Serbin et al. 1979; Nohara 1996 (total number of words); *United States*: Cowan et al 1967*; Haslett & Bowen 1989; Quay & Blaney 1992; Flannagan et al. 1995; DeHart 1996	**NORTH AMERICA** *United States*: Cowan et al 1967*; Heider 1971; Milgram et al. 1971 (total number of words); Harris & Hassemer 1972; Klecan-Aker 1984; Mullis & Mullis 1985; Oscarson et al. 1987 (total number of words); Craig & Evans 1991; McCloskey & Coleman 1992; Foot et al. 1997	**NORTH AMERICA** *United States*: Webb 1984 (total number of words); Morse & Handley 1985 (speech duration)	**NORTH AMERICA** *United States*: Martin & Craig 1982 (college, dyadic interactions); Mc Millan et al. 1977* (dyadic interactions); Cashdan 1998 (young); Robey et al. 1998:385 (married couples)	**NORTH AMERICA** *Canada*: Walker 1991 (speech duration); *United States*: Johnson 1974; Staley 1982 (total number of words)
Females more	**NORTH AMERICA** *United States*: S Goldberg & Lewis 1969; Koenigsknecht & Friedman 1976*; Schachter et al. 1978 (mean length of utterance); Nasur & Gleason 1980 (total number of words); Fagot et al. 1985*; Coster et al. 1989; Reese & Fivush 1993 (speech duration); Morisset et al. 1995 (length of utterance); Leaper & Gleason 1996 **OCEANIA** *Australia*: Hay et al. 1987	**NORTH AMERICA** *United States*: Smith & Connolly 1972 (total number of words); Brownell & Smith 1973; Langlois et al. 1973; Koenigsknecht & Friedman 1976*; McLoyd 1980 (total number of words); DiPietro 1981*; Mather & Black 1984 (total number of words); Charlesworth & Dzur 1987:198	**EUROPE** *Britain*: PK Smith & Connolly 1972; *Finland*: Jormakka 1976 **NORTH AMERICA** *United States*: Lever 1976; DiPietro 1981*; Welkowitz et al. 1984 (speech duration); Buhrmester & Furman 1987; Moore & Porter 1988 (speech duration); Leaper 1991	**NORTH AMERICA** *Canada*: Kolaric & Galambos 1995; *United States*: DM Bush et al. 1987; Raffaelli & Duckett 1989; TE Smith 1997 (self-report)	**NORTH AMERICA** *United States*: Argyle et al. 1968 (dyadic interactions); Marlett 1970 (dyadic interactions); Doherty 1974 (dyadic interactions); Fishman 1977 (young); Ickes & Barnes 1977 (young); McMillan et al. 1977* (females ask more questions); Eakins & Eakins 1978 (dyadic interactions); Brouwer et al. 1979 (females ask more questions); Dabbs & Ruback 1984 (young); Grotenant & Cooper 1985 (respond more extensively to parental questions); De Francisco 1991	**NORTH AMERICA** *United States*: Montemayor & Flannery 1989 (time spent talking); Tannen 1990

9.4.2.3. Affiliative Speech

Affiliative speech is speech that is supportive and in agreement with others that is often interjected while another person is actively speaking. The research findings largely suggest that there is either no significant sex difference in affiliative speech or that such speech is more commonly emitted by females than by males (Table 9.4.2.3). This overall pattern is generally in agreement with a meta-analysis by Leaper and Smith (2004), that concluded that there was a weak tendency toward females exhibiting affiliative speech more than males throughout life.

Table 9.4.2.3. Affliliative speech.

Nature of Any Difference	Prepubertal			Postpubertal	Multiple Age Categories
	Toddler	Early Childhood	Childhood	Adolescent	
Males more			**NORTH AMERICA** *Canada*: Borja-Alvarez et al. 1991 (amount of agreement)		
No signif. difference		**NORTH AMERICA** *United States*: Haslett & Bowen 1989 (amount of responsiveness); Leaper 1991 (amount of responsiveness); Weiss & Sachs 1991 (bargaining speech); Ausch 1994 (amount of agreement)	**EUROPE** *Finland*: Rasku-Puttonen 1983 **NORTH AMERICA** *Canada*: Marche & Peterson 1993* (amount of acknowledgment); *United States*: Zander & Van Egmond 1958 (amount of praise); Schley & Snow 1992 (amount of agreement); Leaper et al. 1999 (amount of responsiveness, among African-Americans)	**NORTH AMERICA** *Canada*: Marche & Peterson 1993* (amount of acknowledgment); Phillipson 1999 (amount of agreement); *United States*: Grotevant & Cooper 1985 (amount of agreement)	**NORTH AMERICA** *Canada*: Denton & Zarbatany 1996 (amount of praise)
Females more	**NORTH AMERICA** *United States*: Haslett 1983 (amount of responsiveness); Klecan-Aker 1986 (amount of responsiveness)	**NORTH AMERICA** *United States*: Becker & Smenner 1986 (amount of suggestions); Black & Hazen 1990 (amount of responsiveness); Black 1992 (amount of responsiveness)	**NORTH AMERICA** *United States*: Miller et al. 1986; Austin et al. 1987 (amount of praise); Strough & Berg 2000	**NORTH AMERICA** *United States*: Feshbach & Sones 1971 (amount of responsiveness); Zeldin et al. 1982 (amount of praise); Filardo 1996 (amount of agreement)	**NORTH AMERICA** *United States*: Burleson 1982 (1st -12th grades, amount of praise)

9.4.2.4. Talking About One's self

Research has consistently shown that males are more likely than females to devote greater proportions of their conversations to themselves, at least during initial social encounters with others (Table 9.4.2.4).

Table 9.4.2.4. Talking about oneself.

Nature of Any Difference	Postpubertal	
	Adolescent	Adult
Males more	**NORTH AMERICA** *United States*: JD Davis 1978 (in initial interactions)	**NORTH AMERICA** *United States*: Lockheed & Hall 1976 (in initial interactions); J Stokes et al. 1980 (in initial interactions); J Stokes et al. 1981 (in initial interactions); Derlega et al. 1985 (in initial interactions)
No signif. difference		
Females more		

9.4.2.5. Friendly/Pro-social Communication in General

Overall friendly/pro-social communication is that which encourages recipients of a conversation to continue conversing and socially interacting. Even though only two relevant studies were located, they both indicate that females are more friendly/prosocial in their communication than are males (Table 9.4.2.5).

Table 9.4.2.5. Friendly/pro-social communication in general.

Nature of Any Difference	Multiple Age Categories
Males more	
No signif. difference	
Females more	**NORTH AMERICA** *United States*: J Wood & Inman 1993 (to maintain social relationships); FL Johnson 1996 (verbal communication to maintain social relationships)

9.4.2.6. Agreeability

People who are agreeable are less likely to challenge or defy the will of others than those who are disagreeable. The relevant research is limited but is consistent in indicating that females are more agreeable than males (Table 9.4.2.6).

Table 9.4.2.6. Agreeability.

Nature of Any Difference	Prepubertal		Postpubertal		Multiple Age Categories
	Toddler	Childhood	Adolescent	Adult	
Males more		**NORTH AMERICA** *United States*: Cannella 1992 (same-sex dads)			
No signif. difference	**NORTH AMERICA** *Canada*: Abramovitch et al. 1979	**NORTH AMERICA** *United States*: Wilkinson et al. 1985			
Females more		**NORTH AMERICA** *United States*: Docherty & Bell 1985*; Leaper 1991 (peer interactions); Leaper et al. 1999 (peer interactions)	**NORTH AMERICA** *Canada*: Hakstian & Cattell 1975:307; *United States*: Docherty & Bell 1985*	**EUROPE** *Poland*: Zawadzki et al. 1995; Szarota 1996	**EUROPE** *Poland*: Szarota et al. 2005:87 **NORTH AMERICA** *United States*: Lakoff 1973

9.4.2.7. Issuing Commands/Orders/Instructions or Using Assertive Speech

According to a meta-analysis by Leaper and Smith (2004), males are more inclined to use assertive speech than are females. This generalization is only supported without qualification by the body of studies reviewed in Table 9.4.2.7 for adults.

9.4.2.7. Issuing commands/orders/instructions or using assertive speech.

Nature of Any Difference	Prepubertal			Postpubertal	
	Toddler	Early Childhood	Childhood	Adolescent	Adult
Males more	**NORTH AMERICA** *Canada*: Kerig et al. 1993	**NORTH AMERICA** *United States*: Hold-Cavell & Borsutzky (commands uttered during play)	**NORTH AMERICA** *United States*: MH Goodwin 1980 (during play); Leaper 1991; Hartup et al. 1993 (number of directive statements); Leaper et al. 1999 (Blacks); A Rose & Asher 1999 (agenic instructions)	**NORTH AMERICA** *United States*: Jarvinen & Nicholls 1996 (agenic instructions)	**NORTH AMERICA** *United States*: A Haas 1979 (when being interviewed); Mulac et al. 1988 (college, e.g., "write that down"); Fultz & Herzog 1991 (agenic instructions); Aruguete & Roberts 2000 (physicians when dealing with patients); Keltner et al. 2003; Athenstaedt et al. 2004
No signif. difference	**NORTH AMERICA** *Canada*: Kuczynski et al. 1987 (assertive speech)	**EUROPE** *Britain*: Lloyd & Goodwin 1993 (number of directive statements) **NORTH AMERICA** *Canada*: Powlishta & Maccoby 1990 (number of directive statements); *United States*: Jacklin & Maccoby 1978 (number of directive statements); Esposito 1979 (interruptions); Camras 1984 (number of directive statements)		**NORTH AMERICA** *United States*: Webb & Kenderski 1985 (number of requests for information); Hauser et al. 1987; Leaper et al. 1989 (assertive speech)	
Females more		**NORTH AMERICA** *Canada*: Serbin et al. 1982 (number of directive statements); *United States*: Hendrick & Storge 1991 (number of interuptions); Eisenberg 1996 (number of directive statements)	**NORTH AMERICA** *United States*: Lindow et al. 1985 (number of directive statements)		

9.4.2.8. Discussing Sexual Experiences

One study concluded that males were more likely than females to provide descriptions of their past premarital sexual experiences (Table 9.4.2.8).

Table 9.4.2.8. Discussing sexual experiences.

Nature of Any Difference	Multiple Age Categories
Males more	**NORTH AMERICA** *United States*: W Simon et al. 1972 (past premarital sexual experiences)
No signif. difference	
Females more	

9.4.2.9. Politeness/Courteous/Considerate Behavior

According to a few studies, most of which are based on analyses of written communication, females are more likely than males to communicate in a polite manner (Table 9.4.2.9).

Table 9.4.2.9. Politeness/courteous/considerate behavior.

Nature of Any Difference	Postpubertal	
	Adolescent	Adult
Males more		
No signif. difference		
Females more	**NORTH AMERICA** *United States*: Sussman & Tyson 2000* (e-mail)	**EUROPE** *Britain*: J Holmes 1989 (apologizing & compliments); Colley & Todd 2002 (college, e-mail) **NORTH AMERICA** *United States*: Eakins & Eakins 1976 (being supportive in mixed sex conversations); Sussman & Tyson 2000* (e-mail)

9.4.2.10. Asking Questions

Numerous studies have investigated gender differences in asking questions. Table 9.4.2.10 shows that most of the results from these investigations have concluded that females ask more questions than do males. The only possible exception is so-called *tag questions* (e.g., "It's cold in here, isn't it?"), for which findings have been inconsistent.

Table 9.4.2.10. Asking questions.

Nature of Any Difference		Postpubertal	Multiple Age Categories
	Childhood	Adult	
Males more		**NORTH AMERICA** *United States*: Dubois & Crouch 1975 (tag questions, mixed sex conference participants); Lapadat & Seesahai 1978 (tag questions, casual mixed-sex conversations)	
No signif. difference			
Females more	**NORTH AMERICA** *United States*: McCloskey 1987 (same & opposite sex dyadic interactions)	**EUROPE** *Britain*: Tannen 1994 **NORTH AMERICA** *United States*: Hartman 1976 (while being interviewed, tag questions); F Crosby & Nyquist 1977 (mixed-sex gatherings); JR McMillan et al. 1977 (mixed-sex groups, tag questions); Fishman 1978; Endsley et al. 1979 (requests for information); Mulac & Lundell 1986 (tag questions); Mc Closkey 1987 (in same & opposite sex dyadic interactions); Mulac et al. 1988 (mixed-dyadic conversations); MA Fitzpatrick et al. 1995	**NORTH AMERICA** *United States*: K Hawkins & Power 1999 (probing questions in committees)

9.4.2.11. Accuracy/Reliability of Linguistic Information Provided

Some social scientists have sought to determine if males or females are more likely to provide trustworthy information on research questionnaires. Table 9.4.2.11 shows that the findings have been inconsistent.

Table 9.4.2.11. Accuracy/reliability of linguistic information provided.

Nature of Any Difference	Prepubertal	Postpubertal
	Childhood	Adult
More in males		**EUROPE** *Sweden*: Barkow et al. 2002 (mental health data)
No signif. difference	**NORTH AMERICA** *United States*: Terman et al. 1925 (honesty)	**NORTH AMERICA** *United States*: Prusoff et al. 1988 (mental health data)
More in females		**NORTH AMERICA** *United States*: Farrer et al. 1989 (mental health data)

9.4.2.12. Mixed-Sex Verbal/Linguistic Communication (Time Spent Conversing)

According to nearly all of the available research, males spend more time than do females conversing in mixed-sex groups (Table 9.4.2.12).

Table 9.4.2.12. Mixed-sex verbal/linguistic communication (time spent conversing).

Nature of Any Dif-ference	Prepubertal				Postpubertal		Multiple Age Categories
		Toddler			Adolescent	Adult	
Males more		**NORTH AMERICA** *United States*: Jacklin & Maccoby 1978			**EUROPE** *Britain*: Swann & Graddol 1988 (classes); Bousted 1989 (classes); Myhill 2002; *Scotland*: Howe 1997	**ASIA** *Japan*: Hayashi 1996 **EUROPE** *Britain*: M Argyle et al. 1968 (young) **NORTH AMERICA** *United States*: Strodbeck 1951; HM Rosenfeld 1966 (young); Marlatt 1970 (young); Hilpert et al. 1975 (young); Duncan & Fiske 1977 (young); Vrugt & Kerkstra 1984 (young); Smith-Lovin et al. 1986 (young); Bilous & Kruss 1988 (young); Mulac et al. 1988 (college); Mulac 1989 (young); Lee 1991 (young)	**NORTH AMERICA** *United States*: Soskin & John 1963; J Bernard 1972; Swacker 1975; DH Zimmerman & West 1975; Aries & Johnson 1983 (males talk more in a heirarchical and directive manner); Kollock et al. 1985
No signif. difference						**NORTH AMERICA** *United States*: Hayashi 1996	
Females more							

9.4.2.13. Arguing and Quarreling/Quarrelsomeness

The majority of studies of people's tendencies to quarrel and argue have concluded that males do so more than do females (Table 9.4.2.13).

Table 9.4.2.13. Arguing and quarreling/quarrelsomeness.

Nature of Any Dif-ference	Prepubertal						Multiple Age Categories
		Toddler	Early Childhood	Childhood			
Males more		**NORTH AMERICA** *United States*: Dawe 1934	**NORTH AMERICA** *United States*: EH Green 1933a (same-sex play); EH Green 1933b; Dawe 1934; RF Marcus 1999	**NORTH AMERICA** *United States*: Macfarlane et al. 1937; Lever 1976:482			**NORTH AMERICA** *United States*: Piliavin & Martin 1978 (disagreeing); Carli 1989 (disagreeing)
No signif. difference			**NORTH AMERICA** *United States*: Jersild & Markey 1935				
Females more							

9.4.2.14. Confiding/Sharing Secrets With Close Friends

Gender differences in the tendency to confide in others have been the subject of numerous empirical investigations. As shown in Table 9.4.2.14, they have all concluded that females are more likely than males to confide in others. This conclusion was also reached in a meta-analysis by Dindia & Allen (1992).

Table 9.4.2.14. Confiding/sharing secrets with close friends.

Nature of Any Difference	Childhood				Postpubertal		Multiple Age Categories
					Adolescent	Adult	
Males more							
No signif. difference							
Females more				**NORTH AMERICA** *United States*: Buhrmester & Furman 1987; Parker & Asher 1993; Bukowski et al. 1994; AJ Rose & Asher 1999	**EUROPE** *Holland*: Landman-Peeters et al. 2005 (when faced with family problems) **NORTH AMERICA** *Canada*: RJ Burke & Weir 1978 (females disclose negative experiences to same sex confidantes more); *United States*: Douvan & Adelson 1966; RE Pimond & Munz 1967; Mulcahy 1968 (same-sex peers); Rivenbark 1971 (same-sex peers); Eder & Hallinan 1978; MA Caldwell & Peplau 1982; Belle 1987 (stress); Camarena et al. 1990; Seiffge-Krenke 1995	**NORTH AMERICA** *United States*: Jourard & Richman 1963 (college); Jourard 1971 (same-sex peers); A Booth 1972:186; W Pearce et al. 1974 (same-sex peers); Hacker 1981 (females disclose more information); FL Johnson & Aries 1983 (females disclose more information); Matthews et al. 1999 (to enhance mood); McKenna et al. 2002 (internet communication); Agrawal et al. 2002 (twins)	**EUROPE** *Britain*: Fuhrer et al. 1999; Fuhrer & Stansfeld 2002 **NORTH AMERICA** *United States*: Jourard & Lasakow 1958 (same-sex peers); O'Conner & Brown 1984; Kraut et al. 1998 (e-mail); Boneva et al. 2001(e-mail)

9.4.2.15. Bragging/Boasting/Exaggerating One's Ability

Several studies have all found that males are more likely than females to brag or exaggerate about their abilities (Table 9.4.2.15).

Table 9.4.2.15. Bragging/boasting/exaggerating one's ability.

Nature of Any Difference					Postpubertal	
				Childhood	Adolescent	Adult
Males more				**NORTH AMERICA** *United States*: Sheehy 1938; McCloskey & Coleman 1992	**EUROPE** *Britain*: J Holmes 1995 **NORTH AMERICA** *United States*: Achenbach & Edelbrock 1981:14; Vollmer 1984	**EUROPE** *Britain*: J Holmes 1995 **NORTH AMERICA** *United States*: M Zuckerman 1979:254; Vollmer 1984 (young); BA Goldman et al. 1990 (about high school GPA)
No signif. difference						
Females more						

9.4.2.16. Gossiping

Most of the available research has indicated that females gossip more than do males (Table 9.4.2.16).

Table 9.4.2.16. Gossiping.

Nature of Any Difference	Prepubertal				Postpubertal	
				Childhood	Adolescent	Adult
Males more						
No signif. difference						**NORTH AMERICA** *United States*: J Levin & Arluke 1985 (college)
Females more				**NORTH AMERICA** *United States*: Kless 1992	**NORTH AMERICA** *United States*: C Leaper & Holliday 1995 (negative gossip)	**MIDDLE EAST** *Israel*: Nevo et al. 1993 (college) **NORTH AMERICA** *United States*: J Levin & Arluke 1985

9.4.2.17. Communicating Through Writing

All of the available research suggests that females communicate through writing more than do males (Table 9.4.2.17).

Table 9.4.2.17. Communicating through writing.

Nature of Any Difference	Prepubertal				Postpubertal	
				Childhood	Adolescent	Adult
Male more						
No signif. difference						
Female more				**NORTH AMERICA** *United States*: Plamondon 1994; Durandell et al. 1995	**NORTH AMERICA** *United States*: Savicki et al. 2002* (computer)	**NORTH AMERICA** *United States*: SR Hitz & Johnson 1990 (computer); B Allen 1995 (college, computer); Weiser 2000 (college, computer); Savicki et al. 2002* (computer)

9.4.2.18. Insulting/Negative Communication

While a couple of studies have failed to reveal any significant gender differences, most research has suggested that males issue more insulting or otherwise negative communication than do females (Table 9.4.2.18).

Table 9.4.2.18. Insulting/negative communication.

Nature of Any Difference					Postpubertal		Multiple Age Categories
						Adult	
Males more					**EUROPE** *Britain*: Archer et al. 1988 (number of negative statements) **NORTH AMERICA** *United States*: McCabe & Lipscombe 1988 (number of negative statements)	**NORTH AMERICA** *United States*: Schreer & Strichartz 1997 (college, in racist graffiti)	**EUROPE** *Britain*: J Holmes 1995 **NORTH AMERICA** *United States*: Stocker et al. 1972 (in racist graffiti); Bruner & Kelso 1981 (in graffiti); Otta 1993 (in graffiti) **OCEANIA** *New Zealand*: JA Green 2003 (in graffiti)
No signif. difference					**NORTH AMERICA** *United States*: Wilkinson et al. 1985		**NORTH AMERICA** *United States*: JA Bates & Martin 1980 (in graffiti)
Females more							

9.4.2.19. Interrupting Others as They Speak (Conversational Dominance)

Regardless of the sex of the other person, nearly all of a substantial number of studies have concluded that males are more likely than females to interrupt others during active speech (Table 9.4.2.19).

Table 9.4.2.19. Interrupting others as they speak (conversational dominance).

Nature of Any Difference					Postpubertal		Multiple Age Categories
						Adult	
Males more						**EUROPE** *Britain*: Leet-Pellegrini 1980 (young) **NORTH AMERICA** *United States*: Heiss 1962 (young); DH Zimmerman & West 1975 (young); Eakins & Eakins 1976; C West 1979 (young); McCarrick et al. 1981; C West & Zimmerman 1983; Dovidio et al. 1988 (college); Makri-Tsilipakov 1994; Redeker & Maes 1996; Keltner et al. 2003; Athenstaedt et al. 2004	**NORTH AMERICA** *United States*: Strodtbeck & Mann 1955
No signif. difference						**NORTH AMERICA** *United States*: Hannah & Murachver 1999:169 (young)	
Females more							

9.4.2.20. Interrupting a Member of the Opposite Sex When He/She is Speaking

Studies that have noted the sex of the person whose speech was interrupted as well as who did the interrupting concluded almost unanimously that males interrupted opposite sex speakers more than did females (Table 9.4.2.20).

Table 9.4.2.20. Interrupting a member of the opposite sex when he/she is speaking.

Nature of Any Difference					Postpubertal		Multiple Age Categories
				Childhood		Adult	
Males more				**NORTH AMERICA** *United States*: Esposito 1979 (young)		**EUROPE** *Britain*: M Argyle et al. 1968 (young) **NORTH AMERICA** *United States*: DH Zimmerman & West 1975* (young); FN Willis & Williams 1976 (college); LR McMillan et al. 1977 (college); C West & Zimmerman 1977 (college); Eakins & Eakins 1978 (young); Natale et al. 1979 (college); Octigan & Niederman 1979* (college); West & Zimmerman 1983 (young); MG Wiley & Woolley 1988	**EUROPE** *Britain*: Argyle et al. 1968 **NORTH AMERICA** *United States*: DH Zimmerman & West 1975*; Zimmerman & West 1975; Eakins & Eakins 1976; Octigan & Niederman 1979*; C West 1979; Edelsky 1981; Kollock et al. 1985
No signif. difference						**NORTH AMERICA** *United States*: Kollack et al. 1985; Robey et al. 1998 (married couples)	
Females more							

9.4.2.21. Sexual Interpretation of Conversation

The available research indicates that males are more likely than females to interpret words and statements as having sexual meaning or innuendos (Table 9.4.2.21).

Table 9.4.2.21. Sexual interpretation of conversation.

Nature of Any Difference					Postpubertal	
						Adult
Males more						**NORTH AMERICA** *United States*: Kutner & Brogan 1974 (college, sexual interpretation of words); Walsh & Leonard 1974 (college, sexual interpretation of words); Robinson et al. 1980 (college, sexual interpretation of words); Plaud et al. 1998 (college, sexual interpretation of words)
No signif. difference						
Females more						

9.4.2.22. Negotiating Behavior

A couple of studies have suggested that males are more actively involved in negotiating with potential employers for higher wages and with prospective buyers regarding prices than are females (Table 9.4.2.22).

Table 9.4.2.22. Negotiating behavior.

Nature of Any Difference					Postpubertal	
						Adult
Males more						**NORTH AMERICA** *United States*: M Nadler & Nadler 1987 (wages); Neu et al. 1988 (higher prices from buyers)
No signif. difference						
Females more						

9.4.2.23. Romantic Communication

One study concluded that males more often than females were the first to say "I love you" in a romantic relationship (Table 9.4.2.23).

Table 9.4.2.23. Romantic communication.

Nature of Any Difference					Postpubertal	
						Adult
Males more						**NORTH AMERICA** *United States*: WF Owen 1987 (first to say "I love you" in written communications to romantic partner)
No signif. difference						
Females more						

9.4.2.24. Song Production

A few studies of song production among birds have indicated that at least among adults, males produce more songs or sing more than do females (Table 9.4.2.24).

Table 9.4.2.24. Song production.

Nature of Any Difference					Postpubertal	
						Adult
Males more						**BIRD** *Marsh Wren*: Canady et al. 1984 (singing repertoire); *Zebra Finch*: Burek et al. 1991 (frequency of singing); Adkins-Regan et al. 1996
No signif. difference						
Females more						

9.4.3. Purpose of Social Behavior and Communication

The general purpose of social behavior and of communication has been the focus of a limited number of studies. Findings are summarized in the tables below.

9.4.3.1. Mutual Support and Inclusiveness

According to several studies, females are more likely than males to exhibit social behavior and communication intended to provide support and inclusiveness to others (Table 9.4.3.1).

Table 9.4.3.1. Mutual support and inclusiveness.

Nature of Any Difference	Prepubertal				Postpubertal	
			Early Childhood	Childhood	Adolescent	Adult
Males more						
No signif. difference						
Females more			**NORTH AMERICA** *United States*: A Sheldon 1990	**NORTH AMERICA** *United States*: A Rose & Asher 1999	**NORTH AMERICA** *United States*: Jarvinen & Nicholls 1996; Strough & Berg 2000 (young)	**NORTH AMERICA** *United States*: Fultz & Herzog 1991

9.4.3.2. Agenic Social Relationships

Working in ways that serve to advance someone else's agenda rather than one's own is known as an agenic social relationship. When sex differences have been found, they suggest that males are more likely than females to form agenic relationships with others, especially in work or other task-specific circumstances (Table 9.4.3.2).

Table 9.4.3.2. Agenic social relationships.

Nature of Any Difference					Postpubertal	
						Adult
Males more						**EUROPE** *Germany*: Abele 2003:771 (college) **NORTH AMERICA** *United States*: JL Yee et al. 1998
No signif. difference						**EUROPE** *Germany*: Abele 2000 (college)
Females more						

9.4.3.3. Communal Social Relationships

Working with others in a mutually supportive fashion rather than competitively or in some type of hierarchical arrangement is referred to as a *communal social relationship*. As shown in Table 9.4.3.3, these types of relationships have been shown to be more characteristic of females than of males.

Table 9.4.3.3. Communal social relationships.

Nature of Any Difference	Postpubertal
	Adult
Males more	
No signif. difference	
Females more	**EUROPE** *Germany*: Abele 2003:771 (college) **NORTH AMERICA** *United States*: Eagly 1987:16 (college); Wright & Scanlon 1991 (college); Duck & Wright 1993 (college)

9.4.4. Conversational Focus

The topics that are the focus of people's discussion have been studied with respect to sex differences. Findings are summarized below.

9.4.4.1. Attending to Conversations/Speech of Others

The available research suggests that female infants and toddlers pay greater attention to utterances of others (at least that of their mothers) than do their male counterparts (Table 9.4.4.1).

Table 9.4.4.1. Attending to conversations/speech of others.

Nature of Any Difference	Prepubertal	
	Infant	Toddler
Males attend more		
No signif. difference		
Females attend more	**NORTH AMERICA** *United States*: R Klein & Durfee 1978 (mother's voice); Gunnar & Donahue 1980 (mother's voice)	**NORTH AMERICA** *United States*: Clarke-Stewart 1973 (mother's voice)

9.4.4.2. Conversations Focused on People

One study was undertaken to determine if males or females focused more of their conversations on people or on things other than people. It concluded that females focused more on people (Table 9.4.4.2).

Table 9.4.4.2. Conversations focused on people.

Nature of Any Difference	Prepubertal
	Toddler
Males higher	
No signif. difference	
Females higher	**NORTH AMERICA** *United States*: Goodenough 1957

9.4.4.3. Conversations Focused on Oneself

The one study that compared the sexes in regard to which focused the greatest proportions of their conversations on themselves rather than on others or on things other than humans concluded that females did so more than males (Table 9.4.4.3).

Table 9.4.4.3. Conversations focused on oneself.

Nature of Any Difference	Multiple Age Categories
Males higher	
No signif. difference	
Females higher	**NORTH AMERICA** *United States*: Sherman & Haas 1984

9.4.4.4. Conversations Focused on Emotions and Feelings

Most of the available research indicates that throughout life, females are more likely than males to engage in conversations about emotions and feelings, especially when conversing among themselves (Table 9.4.4.4).

Table 9.4.4.4. Conversations focused on emotions and feelings.

Nature of Any Difference	Sub-Adolescent			Postpubertal		Multiple Age Categories
	Toddler	Early Childhood	Childhood	Adolescent	Adult	
Males more					**NORTH AMERICA** *United States*: Burhke & Fuqua 1987 (with members of the opposite-sex rather than same-sex); Aukett et al. 1988 (with members of the opposite-sex rather than same-sex)	
No signif. difference				**NORTH AMERICA** *United States*: KJ Anderson & Leaper 1998		
Females more	**NORTH AMERICA** *United States*: J Dunn et al. 1987	**EUROPE** *Britain*: Brandis & Henderson 1970 **NORTH AMERICA** *United States*: S Adams et al. 1995; Reese et al. 1996	**NORTH AMERICA** *United States*: EJ Day 1932; Jourard 1968; Barron 1971*; Alvy 1973; O'Neil et al. 1976 (emotions)	**NORTH AMERICA** *United States*: Jourard 1971; Rivenbark 1971; Mulcahy 1973 (emotions); PH Wright & Crawford 1977 (social relationships); Mulac et al. 1990 (written essays); Buhrmester & Prager 1995	**NORTH AMERICA** *United States*: Gleser et al. 1959; Soskin & John 1963; Wood 1966 (young adult); Barron 1971*; LK Cartwright 1972 (young, medical students); Kramer 1974; Hartman 1976 (elderly); Notarius & Johnson 1982; Parelman 1983 (among married couples); Shimanoff 1983; Wallbott et al. 1986 (especially sadness); Blier & Blier-Wilson 1989 (college, expressing sadness to others); Snell et al. 1989 (especially sadness); Gottman & Levenson 1992; Brody & Hall 1993; Levenson et al. 1994 (among married couples); MA Fitzpatrick et al. 1995 (speech); RJ Burke et al. 1996; Guerrero & Reiter 1998:338 (especially sadness); Polce-Lynch et al. 1998	**NORTH AMERICA** *United States*: JG Allen & Haccoun 1976; Dosser et al. 1983; Sherman & Haas 1984; Sprecher & Sedikides 1993; Goldsmith & Dun 1997 (speech); Fivush et al. 2000 (use of emotive words)

9.4.4.5. Conversations Focused on People's Physical Appearance

Spoken interpersonal communication revolving around body figure, clothing style, hairdo, and the like have been found to be more common among women than among men (Table 9.4.4.5).

Table 9.4.4.5. Conversations focused on people's physical appearance.

Nature of Any Difference	Postpubertal		Multiple Age Categories
	Adolescent	Adult	
Males more			
No signif. difference			
Females more	**NORTH AMERICA** *United States*: Kipers 1987	**NORTH AMERICA** *United States*: Stoke & West 1930 (young); Meil 1984 (young)	**EUROPE** *Britain*: C Landis 1927 **NORTH AMERICA** *United States*: HT Moore 1922; MH Landis & Burtt 1924; J Watson 1948; Bischoping 1993

9.4.4.6. Conversations Focused on People's Behavior

At least following puberty, females appear to engage in conversations with people and their behavior as their focus to a greater extent than is true for males (Table 9.4.4.6).

Table 9.4.4.6. Conversations focused on people's behavior.

Nature of Any Difference	Preadolescent	Postpubertal		
	Early Childhood	Adolescent	Adult	
Males more	**NORTH AMERICA** *United States*: Sause 1976			
No signif. difference				
Females more		**NORTH AMERICA** *United States*: Mukahy 1973	**EUROPE** *Britain*: Landis 1927; Klein 1971 **NORTH AMERICA** *United States*: Moore 1922; MH Landis & Burtt 1924; Komarovsky 1967	:

9.4.4.7. Conversations Focused on Drug Use

One study found that girls had more conversations with their mothers regarding drug use than did boys, although there were no significant sex differences in similar conversations with fathers (Table 9.4.4.7).

Table 9.4.4.7. Conversations focused on drug use.

Nature of Any Difference	Postpubertal	
	Adolescent	
Males more		
No signif. difference	**EUROPE** *Spain*: Suris & Parera 2005: 486* (conversation with fathers, self report)	
Females more	**EUROPE** *Spain*: Suris & Parera 2005: 486* (conversation with mothers, self report)	:

9.4.4.8. Conversations Focused on Leisure or Work

Studies have consistently found that males focus more of their conversations on leisure or work than do females (Table 9.4.4.8).

Table 9.4.4.8. Conversations focused on leisure or work.

Nature of Any Difference	Postpubertal		Multiple Age Categories
	Adolescent	Adult	
Males more	**NORTH AMERICA** *United States*: Mulcahy 1973; PH Wright & Crawford 1977 (focused on goals and activities); Kipers 1987	**EUROPE** *Britain*: Landis 1927; Klein 1971 **NORTH AMERICA** *United States*: Moore 1922; MH Landis & Burtt 1924; Stoke & West 1930 (young); Komarovsky 1967; Meil 1984 (young)	**EUROPE** *Britain*: C Landis 1927 **NORTH AMERICA** *United States*: HT Moore 1922; J Watson 1948; Aries & Johnson 1983 (young); Bischoping 1993
No signif. difference			
Females more			

9.4.4.9. Conversations Focused on the Opposite-Sex

According to one study, when men were overheard speaking to one another, they discussed the opposite-sex only 8% of the time. Women, on the other hand, discuss the opposite-sex 44% of the time in their conversations (Table 9.4.4.9).

Table 9.4.4.9. Conversations focused on the opposite-sex.

Nature of Any Difference	Postpubertal
	Adult
Males more	
No signif. difference	
Females more	**NORTH AMERICA** *United States*: HT Moore 1922 (people on the street)

9.4.4.10. Conversations Focused on Sexuality

According to one study, a greater proportion of conversations among males focus on sexuality than among females, both for adolescents and for adults (Table 9.4.4.10).

Table 9.4.4.10. Conversations focused on sexuality.

Nature of Any Difference				Postpubertal	
				Adolescent	Adult
Males more				**ASIA** *Japan*: Nakanishi 1986* **EUROPE** *Spain*: Suris & Parera 2005: 486* (conversation with fathers, self report)	**ASIA** *Japan*: Nakanishi 1986*
No signif. difference					
Females more				**EUROPE** *Spain*: Suris & Parera 2005: 486* (conversation with mothers, self report)	

9.4.4.11. Conversations Focused on Sports

As shown in Table 9.4.4.11, males seem to engage in conversations focused on sports more than do females.

Table 9.4.4.11. Conversations focused on sports.

Nature of Any Difference					Postpubertal
					Adult
Males more					**NORTH AMERICA** *United States*: Stoke & West 1931 (college); Dominick 1999 (on the internet)
No signif. difference					
Females more					

9.4.4.12. Conversations Focused on Current Events

Most of the research on gender differences in conversations focused on local, national, or world issue or ideas concluded that they were more frequent among males (Table 9.4.4.12).

Table 9.4.4.12. Conversations focused on current events.

Nature of Any Difference				Postpubertal		Multiple Age Categories
				Adolescent	Adult	
Males more					**NORTH AMERICA** *United States*: Stoke & West 1930 (young); Langer 1970a; Langer 1970b; Meil 1984 (young)	**EUROPE** *Britain*: C Landis 1927 **NORTH AMERICA** *United States*: HT Moore 1922; MH Landis & Burtt 1924; J Watson 1948; Bischoping 1993
No signif. difference						
Females more				**NORTH AMERICA** *United States*: Kipers 1987		

9.5
PLAY, SPORTS, GAMES, AND ENTERTAINMENT

Play and entertainment have been the focus of considerable social science research. Findings from these studies are summarized in the following section.

9.5.1. Play

Play is a difficult concept to define, although nearly everyone recognizes it when they witness it. It is especially common among young mammals and usually involves activities that resemble "serious" behavior (such as aggression and competition) exhibited by adults as aspects of their efforts to survive and reproduce.

9.5.1.1. Nonsocial Play or Play in General

Some play involves inanimate objects or members of species other than one's own, herein termed *nonsocial play*. Studies of nonsocial play or play in general have involved a variety of primate species. These studies have reached inconsistent conclusions regarding any gender differences in play, although most have concluded that males play more than do females (Table 9.5.1.1).

Table 9.5.1.1. Nonsocial play or play in general.

Nature of Any Difference	Prepubertal			Postpubertal		Multiple Age Categories
	Toddler	Early Childhood	Childhood	Adolescent	Adult	
Males more	**ASIA** *Russia*: Sevaleva & Kraswski 1929 (groups)	**NORTH AMERICA** *United States*: JS Hatfield et al. 1967:376 (fantasy aggressive play); RM Sanders & Harper 1976 (fantasy play)	**PRIMATE (EXCEPT APE)** *Baboon*: Kummer 1968; NW Owens 1975; *Langur*: Dolhinow & Bishop 1970; *Rhesus Macaque*: HF Harlow & Harlow 1965	**AFRICA** *Nigeria*: Robson 2004:200 **NORTH AMERICA** *United States*: Duncan & Sanik 1989 (leisure activities); Mauldin & Meeks 1990 (leisure activities) **PRIMATE (EXCEPT APE)** *Vervet Monkey*: Bramblett 1978* **UNGULATE** *Reindeer*: JH Mathisen et al. 2003	**NORTH AMERICA** *United States*: Firestone & Shelton 1988 (married couples, leisure); Freysinger 1994 (married couples, leisure)	**NORTH AMERICA** *United States*: Vaughter et al. 1994 (sports)
No signif. difference		**NORTH AMERICA** *United States*: Melson 1977 **PRIMATE (EXCEPT APE)** *Rhesus Macaque*: Kaufman 1966; Hinde & Spencer-Booth 1967a		**PRIMATE (EXCEPT APE)** *Talapoin Monkey*: JA Wolfheim 1978		
Females more					**PRIMATE (EXCEPT APE)** *Vervet Monkey*: Bramblett 1978* (young)	

9.5.1.2. Playing With Masculine (Rather Than Feminine) Toys

Generally, masculine toys are more physical in nature rather than social. As one would expect, males exhibit more play with masculine toys than do females. Notably, however, this sex difference was even documented among one species of nonhuman primates (Table 9.5.1.2).

Table 9.5.1.2. Playing with masculine (rather than feminine) toys.

Nature of Any Difference	Prepubertal		
	Toddler	Early Childhood	Childhood
Males more	**NORTH AMERICA** *United States:* McCandless & Evans 1973; Fein et al. 1975 (hammer/truck/gun); Fagot 1978:462 (transportation toys & blocks); O'Brien & Huston 1985; Roopnarine 1986	**EUROPE** *Britain*: PJ Turner et al. 1993 **NORTH AMERICA** *United States*: Borstelmann 1961; Mendel 1965 (novelty of play); LV Harper & Sanders 1975 (tractors); Blomberg 1981; MB Liss 1981	**EUROPE** *Britain*: S Johnson 1987:27 (fish, chess, pool, model airplane); Benenson et al. 1997 **PRIMATE (EXCEPT APE)** *Vervet Monkey*: GM Alexander & Hines 2002
No signif. difference			
Females more			

9.5.1.3. Social Play in General

Most studies of play with conspecifics (social play) have indicated that males play more than do females (Table 9.5.1.3).

Table 9.5.1.3. Social play in general.

Nature of Any Difference	Prepubertal		Postpubertal
	Toddler	Childhood	Adolescent
Males more	**NORTH AMERICA** *United States*: S Goldberg & Lewis 1969	**PRIMATE (EXCEPT APE)** *Baboon*: NW Owens 1975; *Japanese Macaque*: Koyama 1985; Nakamichi 1989	
No signif. difference			**PRIMATE (EXCEPT APE)** *Talapoin Monkey*: Wolfheim 1978
Females more			

9.5.1.4. Same-Sex (Versus Opposite-Sex) Playmates

The available evidence on sex differences in same-sex as opposed to opposite-sex play has concluded that either there are no gender differences in this regard or that males are more likely than females to engage in same-sex play (Table 9.5.1.4).

Table 9.5.1.4. Same-sex (versus opposite-sex).playmates.

Nature of Any Difference	Prepubertal	
	Toddler	Childhood
Same-sex playmates		**PRIMATE (EXCEPT APE)** *Bonnet Macaque*: Rosenblum et al. 1975; *Japanese Macaque*: Imanishi 1963*; *Tibetan Macaque*: Deng 1993; Deng & Zhao 1987
No signif. difference	**PRIMATE (EXCEPT APE)** *Japanese Macaque*: K Imanishi 1963* (no sex preferences in playmates)	**NORTH AMERICA** *United States*: Thorne & Luria 1986; Thorne 1993; Leaper 1994
Opposite-sex playmates		

9.5.1.5. Strenuousness/Vigorousness of Play

Three studies indicate that males engage in more strenuous forms of play than do females (Table 9.5.1.5).

Table 9.5.1.5. Strenuousness/vigorousness of play.

Nature of Any Difference	Prepubertal	
	Toddler	Childhood
Males more	**NORTH AMERICA** *United States*: S Goldberg & Lewis 1969	**NORTH AMERICA** *United States*: Lehman & Witty 1927; JC Foster 1930
No signif. difference		
Females more		

9.5.1.6. Variability in Play Activities

According to one study, males were more variable than were females in their play activities (Table 9.5.1.6).

Table 9.5.1.6. Variability in play activities.

Nature of Any Difference	Prepubertal
	Childhood
Males more	**NORTH AMERICA** *United States*: Lehman & Witty 1927
No signif. difference	
Females more	

9.5.1.7. Adult-Child Play

A few studies, including ones involving nonhuman primates, have indicated that males engage in more cross-generational play, although one study of adults concluded that there was no significant difference (Table 9.5.1.7).

Table 9.5.1.7. Adult-child play.

Nature of Any Difference	Prepubertal		Postpubertal
	Toddler	Childhood	Adult
Males more	**NORTH AMERICA** *United States*: S Goldberg & Lewis 1969 (more vigorously)	**PRIMATE (EXCEPT APE)** *Baboon*: NW Owens 1975; *Japanese Macaque*: Koyama 1985; Nakamichi 1989	
No signif. difference			**NORTH AMERICA** *United States*: Biernot & Wortman 1991 (offspring of dual-income couples)
Females more			

9.5.1.8. Play Outside (Rather Than Inside) the Home

Two studies found that boys were more likely than females to engage in play outdoors than indoors (Table 9.5.1.8).

Table 9.5.1.8. Play outside (rather than inside) the home.

Nature of Any Difference	Prepubertal		Postpubertal
	Early Childhood	Childhood	Adolescent
Males more	**NORTH AMERICA** *United States*: Van Alstyne 1932	**NORTH AMERICA** *United States*: Witty & Lehman 1930; Lever 1976; Pitcher & Schultz 1983:79	**AFRICA** *Nigeria*: Robson 2004:200; *Sudan*: C Katz 1991
No signif. difference			
Females more			

9.5.1.9. Play With Inanimate Objects in General

In the present context, inanimate objects refer to objects other than clothing that do not resemble living things such as dolls and stuffed animals. Common types of inanimate objects that are used in play would be those used for construction and transport in the adult world.

Research pertaining to gender differences in the tendency to play with various inanimate objects has not reached unanimous conclusions partly because the specific types of inanimate objects available can sometimes make a difference. Nevertheless, as shown in Table 9.5.1.9, studies have generally concluded that males are more likely than females to play with most types of inanimate objects.

Table 9.5.1.9. Play with inanimate objects in general.

Nature of Any Difference	Prepubertal			Postpubertal
	Toddler	Early Childhood	Childhood	Adolescent
Males more	**NORTH AMERICA** *United States*: Fagot 1978:462 (transportation toys & blocks); Fein et al. 1975 (hammer/truck/gun); O'Brien & Huston 1985; McCandless & Evans 1973* (masculine toys)	**NORTH AMERICA** *United States*: G Mendel 1965 (novelty of play)	**EUROPE** *Britain*: Acher 1910* (making functional tools); S Johnson 1987:27 (chess, pool, model airplane); Benenson et al. 1997 **PRIMATE (EXCEPT APE)** *Vervet Monkey*: GM Alexander & Hines 2002 **FELINE** *Cat*: P Barrett & Bateson 1978 (captivity)	**NORTH AMERICA** *United States*: Hildreth 1933 (chess)
No signif. difference			**NORTH AMERICA** *United States*: Acher 1910* (use of stones) **FELINE** *Cat*: MJ West 1975 (captivity)	
Females more	**NORTH AMERICA** *United States*: Etaugh et al. 1975 (paint); McCandless & Evans 1973* (feminine toys)			

9.5.1.10. Play Involving Clothing and Dress-Up

Two studies (by the same researcher) concluded that play involving dressing up in costumes and other clothing was more common among females than among males (Table 9.5.1.10).

Table 9.5.1.10. Play involving clothing and dress-up.

Nature of Any Difference	Prepubertal
	Toddler
Males more	
No signif. difference	
Females more	**NORTH AMERICA** *United States*: Fagot 1974; Fagot 1978:462

9.5.1.11. Play Involving Dolls and Stuffed Animals

Several studies have sought to determine if a sex difference exists in terms of play with dolls and stuffed animals. As shown in Table 9.5.1.11, these studies have consistently found that females play with such objects to a greater degree than males. Not only has this been found in studies of human children in three different continents, but it was also even documented in one study of a nonhuman primate.

Table 9.5.1.11. Play involving dolls and stuffed animals.

Nature of Any Difference	Prepubertal			Postpubertal	
	Toddler	Early Childhood	Childhood	Adolescent	Adult
Males more					
No signif. difference					
Females more	**NORTH AMERICA** *United States*: Fagot 1978:462 (dolls)	**NORTH AMERICA** *United States*: Acher 1910; Van Alstyne 1932; Wolf 1976:27	**AFRICA** *South Africa*: Eibl-Eibesfelt 1989 (!Kung tribe) **EUROPE** *Germany*: Scheifler 1913 **NORTH AMERICA** *United States*: Acher 1910; Lehman & Witty 1930; Honzik 1951; Wolf 1976:27; JM Connor & Serbin 1977; Liss 1981; N Eisenberg et al. 1982; Sandberg & Meyer-Bahlburg 1994 **PRIMATE (EXCEPT APE)** *Vervet Monkey*: GM Alexander & Hines 2002	**NORTH AMERICA** *United States*: Basset 1929	**NORTH AMERICA** *United States*: Witty & Lehman 1930 (young)

9.5.1.12. Playing House/Pretend Parenting

Playing house involves assuming the role of a parent and pretending to engage in care giving activities and other supportive domestic chores, usually in conjunction with one or more same-age playmates. Nearly all such play activities occur prior to the onset of puberty.

As one can see by viewing Table 9.5.1.12, all pertinent studies have found females to be more involved in playing house and in pretend-parenting than males. Most studies of nonhuman primate species have indicated that females were more inclined than their male age-mates to play with young infants.

Table 9.5.1.12. Playing house/pretend parenting.

Nature of Any Difference	Prepubertal	
	Early Childhood	Childhood
Males more		
No signif. difference		**PRIMATE (EXCEPT APE)** *Barbary Macaque*: FD Burton 1972
Females more	**NORTH AMERICA** *United States*: Acher 1910; Goodenough 1957; Earls 1987; J Connolly et al. 1988 **NORTH AMERICA** *United States*: TF Vance & McCall 1934 **PRIMATE (EXCEPT APE)** *Olive Baboon*: NW Owens 1975a	**NORTH AMERICA** *United States*: Zelig 1962 (planting flowers); Sutton-Smith et al. 1963; Lever 1978; Pitcher & Schultz 1983; Paley 1984; Sandberg & Meyer-Bahlburg 1994 **PRIMATE (EXCEPT APE)** *Rhesus Macaque*: Chamove et al. 1972; *Vervet Monkey*: Lancaster 1971; Gartlan 1968

9.5.1.13. Play With Mechanical/Construction/Building Objects

Investigations into gender differences in tendencies to play with mechanical toys or toys that involve constructing or building things have almost unanimously concluded that males do so more than females (Table 9.5.1.13).

Table 9.5.1.13. Play with mechanical/construction/building objects.

Nature of Any Difference	Prepubertal				Postpubertal
	Infant	Toddler	Early Childhood	Childhood	Adolescent
Males more	**NORTH AMERICA** *United States*: ME Snow et al. 1983	**NORTH AMERICA** *United States*: RB McCall 1974; Fagot 1974; Etaugh et al. 1975; GM Alexander & Hines 1994	**NORTH AMERICA** *United States*: Van Alstyne 1932; TF Vance & McCall 1934; JM Connor & Serbin 1977; GF Melson 1977; Liss 1981; Earls 1987; Berenbaum & Hines 1992	**EUROPE** *Germany*: Scheifler 1913 **NORTH AMERICA** *United States*: Acher 1910* (making functional tools); Lehman & Witty 1930; Honzik 1951; MG Jones et al. 2000:768	**NORTH AMERICA** *United States*: Acher 1910*; Lehman & Witty 1930
No signif. difference				**NORTH AMERICA** *United States*: Acher 1910* (use of stones)	
Females more					

9.5.1.14. Spatially Oriented Play/Activities

According to two studies, males were more likely than females to engage in spatially-orientated play activities (Table 9.5.1.14).

Table 9.5.1.14. Spatially oriented play/activities.

Nature of Any Difference	Prepubertal			Postpubertal	
		Early Childhood	Childhood	Adolescent	
Males more		**NORTH AMERICA** *United States*: JM Connor & Serbin 1977	**NORTH AMERICA** *Canada*: Grimshaw et al. 1995:92 (school age)	**EUROPE** *Britain*: M O'Brien et al. 2000 (spatial mobility)	
No signif. difference					
Females more					

9.5.1.15. Competitive Social Play

Competitive social play involves games in which the goal is for one of the players to win and the other to lose. The nature of winning can vary a great deal, all the way from scoring more points to the death of one's opponent.

Studies that have sought to determine if males or females are more likely to engage in competitive social play are summarized in Table 9.5.1.15. As the table indicates, nearly all studies indicate that males are more likely to engage in competitive social play than females.

Table 9.5.1.15. Competitive social play in general.

Nature of Any Difference	Prepubertal				Postpubertal		Multiple Age Categories
		Toddler	Early Childhood	Childhood	Adolescent	Adult	
Males more		**PRIMATE (EXCEPT APE)** *Japanese Macaque*: Itoigawa 1973; GG Eaton et al. 1985:241	**NORTH AMERICA** *United States*: RM Sanders & Harper 1976 (competition in fantasy play) **PRIMATE (EXCEPT APE)** *Rhesus Macaque*: IS Bernstein et al. 1993	**NORTH AMERICA** *Canada*: Benenson et al. 2002; Roy & Benenson 2002; *United States*: Waldrop & Halverson 1973; J Lever 1978; Ahlgren & Johnson 1979* (self-report); Di Pietro 1981; Leaper 1991 (playing with puppets); Leaper et al. 1999	**NORTH AMERICA** *United States*: Bem 1974 (self-report); Ahlgren & Johnson 1979* (self-report)	**NORTH AMERICA** *United States*: Bond & Vinacke 1961 (college, experimental game, sought to divide prizes unequally); Uesugi & Vinacke 1963 (college, experimental game, sought to divide prizes unequally); Rosenkrantz et al. 1968 (college, self-report)	**NORTH AMERICA** *United States*: Leventhal & Anderson 1970 (experimental game, sought to divide prizes unequally); Leventhal & Lane 1970 (experimental game, sought to divide prizes unequally)
No signif. difference				**NORTH AMERICA** *United States*: Goodenough 1930			
Females more							

9.5.1.16. Female Competitiveness During Games and Tasks With Male Opponents (as Opposed to Female Opponents)

A special aspect of competitive social play involves the sex of the opponent. Several studies have sought to explore the possibility that females diminish their competitiveness when they have an opposite sex opponent relative to when their opponent is of the same sex.

As shown in Table 9.5.1.16, studies have produced mixed results, with some suggesting that females become more competitive when engaged in two-person games with male opponents (rather than female opponents), while at least one study indicated that they become less competitive when confronting male opponents. Studies finding no significant differences have indicated that some females become more competitive while others become less competitive when competing against males. Some of the studies have indicated that the results may vary depending on whether the male opponent is in proximity to the female when the game is in progress or whether the task in which they are involved is male-typical or female-typical (reviewed by CC Weisfeld 1986).

Table 9.5.1.16. Female competitiveness during games and tasks with male opponents (as opposed to female opponents).

Nature of Any Difference	Prepubertal	Postpubertal	
	Childhood	Adolescent	Adult
Females more competitive with a male opponent		**NORTH AMERICA** *United States*: Nowicki et al. 1978; Valle et al. 1978	
No signif. difference		**NORTH AMERICA** *United States*: Krauss 1977*	**NORTH AMERICA** *United States*: Horner 1968 (college); House 1974; Karabenick & Marshall 1974; Mausner & Coles 1978 (college); Stake & Stake 1979; AD Jackson 1982
Females less competitive with a female opponnent	**NORTH AMERICA** *United States*: Krauss 1977*; Cronin 1980; Weisfeld et al. 1982 (dodgeball); Weisfeld et al. 1983 (spelling bee)		

9.5.1.17. Inhibiting Competitiveness With Member of the Opposite-Sex

Competitive inhibition refers to the tendency not to try as hard as one can when engaged in some form of competition. At least among adolescents, females report being more likely than males to inhibit their degree of competition when opposing a member of the opposite-sex (Table 9.5.1.17).

Table 9.5.1.17. Inhibiting competitiveness with member of the opposite-sex.

Nature of Any Difference	Postpubertal
	Adolescent
Males more	
No signif. difference	
Females more	**NORTH AMERICA** *United States*: SW Morgan & Mausner 1973 (hidden figures test); Peplau 1976

9.5.1.18. Cooperative Social Play

Cooperative forms of social play involve supporting and reinforcing one another's activities rather than trying to block or compete against those activities. All of the available research indicates that females are more likely than males to engage in cooperative forms of social play (Table 9.5.1.18).

Table 9.5.1.18. Cooperative social play.

Nature of Any Difference	Prepubertal	
	Early Childhood	Childhood
Males more		
No signif. difference		
Females more	**NORTH AMERICA** *United States*: KH Rubin et al. 1976; RM Sanders & Harper 1976 (fantasy play); KH Rubin et al. 1978; C Garcia 1994	**NORTH AMERICA** *United States*: Etaugh 1983; Leaper 1991 (playing with puppets); Thorne 1993 (groups are more polite, helpful, and caring); Leaper et al. 1999 (Blacks); Maccoby 2002 (in smaller, more intimate groups); Underwood 2003 (in smaller, more intimate groups)

9.5.1.19a. Rough-and-Tumble Play/Play Fighting Among Humans

Play fighting or rough-and-tumble play involves individuals attempting to gain some sort of physical advantage over a playmate. While the difference between play fighting and "real fighting" is not easily described, nearly everyone readily recognizes it. In play fighting, combatants rarely persist to the point of causing injury, and they often interact with relatively relaxed open-mouth expressions as opposed to stern frowns. Another common difference is age: Most play fighting is exhibited by prepubertals, whereas "real fighting" is much more characteristic of adolescents and adults.

Table 9.5.1.18a provides evidence of a clear tendency for males to engage in play fighting more often and with greater persistence than females. The few exceptions simply failed to find any significant gender differences.

Table 9.5.1.19a. Rough-and-tumble play among humans.

Nature of Any Difference	Prepubertal				Postpubertal		Multiple Age Categories (Primarily Prepubertal)
	Infant	Toddler	Early Childhood	Childhood	Adolescent		
Males more	**NORTH AMERICA** *United States*: DW Campbell & Eaton 1999	**NORTH AMERICA** *United States*: Hattwick 1937; Muste & Sharpe 1947; AH Clark et al. 1969; S Goldberg & Lewis 1969; SB Messer & Lewis 1972:301; Jacklin et al. 1973; Fagot & Hagan 1985	**EUROPE** *Britain*: Blurton-Jones 1967*; PK Smith & Connolly 1972*; PK Smith 1977* **NORTH AMERICA** *United States*: Acher 1910*; TF Vance & McCall 1934; MW Johnson 1935; GR Bach 1945; Pintler et al. 1946; Blurton-Jones 1967*; AH Clark et al. 1969 (same sex); PK Smith & Connolly 1972*; Brindley et al. 1973*; Stewart & Leone 1978; JL Singer et al. 1980; DiPietro 1981*; Morey 1981b; Fagot & Leinback 1983 (preschool); Pitcher & Schultz 1983:56*; Sprofkin et al. 1983 (preschool); D Cole & LaVoie 1985; Savin-Williams 1987; McLoyd &Wilson 1990 (Blacks); Moller et al. 1992*; Hines & Kaufman 1994*; Braza et al. 1997; TK Neppl & Murray 1997; RJ Coplan et al. 1998	**AFRICA** *South Africa*: Eibl-Eibesfeldt 1989:269 (!Kung Tribe Bushmen) **EUROPE** *Britain*: PK Smith & Green 1975 **LATIN AMERICA** *Mexico*: DP Fry 1990* (Zapotec Tribe) **NORTH AMERICA** *United States*: Acher 1910*; Lehman & Witty 1930; BG Rosenberg & Sutton-Smith 1959; Pitcher & Prelinger 1963; Blurton-Jones 1972; Blurton-Jones & Konner 1973; Brindley et al. 1973*; Lever 1976; PK Smith 1977*; Crum 1980; DiPietro 1981*; Hertz-Lazarowitz et al. 1981; Pitcher & Schultz 1983*; Paley 1984; Humphreys & Smith 1987; Pellegrini 1989; Moller et al. 1992*; GM Alexander & Hines 1994; Hines & Kaufman 1994*; Frey & Hoppe-Graff 1994; Fabes et al. 1997; Braggio et al. 1998; Maccoby 2002; Hines 2003; Underwood 2003 **OCEANIA** *Various South Pacific Island Cultures*: Davenport 1965 **INTERNATIONAL** *Various Pacific Island Cultures*: Davenport 1965	**NORTH AMERICA** *United States*: Lehman & Witty 1927:242		**LATIN AMERICA** *Columbia*: Chagnon 1988 (Yanomamo) **NORTH AMERICA** *United States*: BG Rosenberg & Sutton-Smith 1960; Whiting & Edwards 1973 (ages 3-11); Aldis 1975; Maccoby 1988
No signif. differ.			**NORTH AMERICA** *United States*: WC McGrew 1972; KH Hammer & Missakian 1978	**LATIN AMERICA** *Mexico*: DP Fry 1990* (Zapotec children)			
Females more							

9.5.1.19b. Rough-and-Tumble Play Among Prepubertal Nonhumans

As with humans, play fighting or rough-and-tumble play among nonhumans involves subjects attempting to gain some advantage over the partner without inflicting injury. It is worth noting that play fighting is virtually unknown outside of the mammalian order even though fighting itself is common throughout the animal kingdom. Unlike fighting in earnest, once "victory" is gained in a bout of play fighting, the "loser" is freed, and another bout often begins.

Split-Table 9.5.1.19b shows that most studies of prepubertals have concluded that males engage in play fighting more often and with greater vigor than do females. Even so, there are some important caveats that need to be considered when drawing conclusions from this apparently robust sex difference. Firstly, most studies are limited to mammals (owing to the fact that play is virtually unknown outside the mammalian order). In this context, it is important to note that there are some lineages of animals (e.g., some groups of carnivores and New World monkeys) where females play as much as males, or even more so. Secondly, in the few very well studied species (e.g., rats, hamsters, rhesus monkeys) for which multiple reports are available showing a strong male bias, it is also the case that under some experimental designs, this sex difference can be diminished or even eliminated. Typically, the male biased sex difference in the propensity to engage in play fighting is most strongly evident when the subjects are observed under naturalistic conditions. That is, this sex difference is reduced with greater experimental constraints on the subjects' behavior. Also, importantly, for studies involving domesticated animals, not all strains of the same species (e.g., rats) show the male bias in play fighting. Thirdly, there is a possible descriptive confound in reported cases of play fighting. Play fighting can involve competition over sexual and predatory body targets as well as aggressive ones. Often sexual ones are only so categorized if they involve mounting, with those involving competition for body targets contacted in precopulatory phases of sex being categorized with those involving competition for aggressive targets. Such cases may give an incorrect categorization of male and female involvement in the play fighting, as revealed by instances when these two forms of competitive play can be distinguished. For example, in ground squirrels, which engage in both types of play, there is a strong sex difference for competition over sexual play (males > females), but not for aggressive play. Finally, the sex differences may only appear in the typical direction at specific ages. For example, in rhesus monkeys, males and females engage in similar levels of play fighting during infancy but then diverge with the onset of the juvenile phase and into adolescence. In contrast, young male orangutans play fight more often than females, but as adults, females seek out opportunities to play fight more often. Therefore, while the reports in the literature overwhelmingly demonstrate that males engage in more and rougher play fighting than females, it is far from clear what the significance is of this difference. As among humans, the weight of the evidence among prepubertal nonhumans is that males engage in rough-and-tumble play more than is the case for females.

Split-Table 9.5.1.19b. Rough-and-tumble play among prepubertal nonhumans.

Nature of Any Difference	Prepubertal			
		Toddler	Early Childhood	Childhood
Males more		**APE** *Gorilla*: Hoff et al. 1981 **CANINE** *Several Species*: Bekoff 1974* **MAMMAL** *Elephant Seal*: Rasa 1971 **PRIMATE (EXCEPT APE)** *Baboon*: GH Young et al. 1982; *Bonnet Macaque*: PE Simonds 1974; *Japanese Macaque*: GG Eaton et al. 1985; *Langur*: Jay 1963; *Rhesus Macaque*: Harlow 1962*; EW Hansen 1966; EW Hansen et al. 1966; Hinde & Spencer-Booth 1967*; Goldfoot & Wallen 1978; Tartabini 1991; *Squirrel Monkey*: JD Baldwin 1969*	**PRIMATE (EXCEPT APE)** *Baboon*: Ranson & Rowell 1972 (isolated/feral); *Rhesus Macaque*: Harlow 1962*; Nieuwenhujsen et al. 1988:362*; *Rhesus Macaque*: HF Harlow & Harlow 1965; Hinde & Spencer-Booth 1967*; Goy 1968; Brown & Dixson 2000; *Squirrel Monkey*: JD Baldwin 1969*	**APE** *Chimpanzee*: Spijkerman et al. 1996 **FELINE** *Cat*: Barrett & Bateson 1978 **MAMMAL** *Seal*: Arnold & Trillmich 1985 **MUSTELID** *Ferret*: Biben 1982 **PRIMATE (EXCEPT APE)** *Baboon*: NW Owens 1975b*; DL Cheney 1978; *Crab-Eating Macaque*: Seay et al. 1972*; *Japanese Macaque*: Eaton et al. 1986*; *Patas Monkey*: Seay et al. 1972*; *Rhesus Macaque*: Harlow & Harlow 1965; Harlow 1965*; Young et al. 1965; Goy 1968; Fady 1969; Lindburg 1971*; Brandt & Mitchell 1973; CL Anderson & Mason 1974; Ruppenthal et al. 1974 (same sex); Suomi 1977 (same sex); Goy 1978; D Symons 1978*; Janus 1989; Wallen 1996; *Squirrel Monkey*: JD Baldwin 1969; *Talapoin Monkey*: Wolfheim 1977* **RODENT** *Rat*: Seward 1945*; Olioff & Stewart 1978*; MJ Meaney & Stewart 1981b*; MJ Meaney et al. 1985; Thor & Holloway 1983; Birke & Sadler 1987; Pellis et al. 1994; SM Pellis et al. 1997; Olioff & Stewart 1978* **UNGULATE** *Cattle*: Reinhardt et al. 1978; Vitale et al. 1986; *Horse*: Crowell-Davis et al. 1987*; *Ibex*: Byers 1977; *Gazelle*: Gomendio 1988; *Scimitar-Horned Oryx*: Pfieffer 1985; *Welsh Pony*: Crowell-Davis et al. 1987*
No signif. difference		**CANINE** *Coyote*: Hill & Bekoff 1977; *Hyena*: Drea et al. 1996; *Several Species*: Bekoff 1974* **PRIMATE (EXCEPT APE)** *Baboon*: Young & Bramblett 1977; Young & Hawkins 1979; *Rhesus Macaque*: Kaufman 1966 (free-living) **RODENT** *Hamster*: Guerra et al. 1992	**PRIMATE (EXCEPT APE)** *Macaque*: Niewenhuijsen et al. 1988:362*	**PRIMATE (EXCEPT APE)** *Marmoset*: HO Box 1975 (captive) **UNGULATE** *Pig*: Newberry et al. 1988
Females more		**PRIMATE (EXCEPT APE)** *Howler Monkey*: MR Clarke 1982; MR Clarke 1990 (free-living)		**PRIMATE (EXCEPT APE)** *Howler Monkey*: Zucker & Clarke 1992; *Talapoin Monkey*: Wolfheim 1977* **CANINE** *Hyena*: Pedersen et al. 1990

9.5.1.19c. Rough-and-Tumble Play Among Postpubertal and Multiple Aged Nonhumans

Split-Table 9.5.1.19c indicates that for the majority of species, males are more prone than females to engage in rough-and-tumble play. Nevertheless, a few species may be exceptions in the sense that such play is equally prevalent in both sexes. Some of the studies that failed to find a significant difference (or actually finding that females play fought more than males) may be the result of fairly small samples of subjects being observed. Another factor may be the particular type of play fighting involved. In this regard, as will be noted in the subsequent table, in some species females have been found to play chase more than males (but without play fighting after catching a playmate). Some researchers may not have always clearly distinguished play chasing from play fighting.

Split-Table 9.5.1.19c. Rough-and-tumble play/play fighting, (non-human, prepubertal & multiple ages).

Nature of Any Difference	Postpubertal		Multiple Age Categories (Primarily Prepubertal)
	Adolescent	Adult	
Males more	**APE** *Chimpanzee*: Nadler & Braggio 1974*; Savage & Malick 1977 (captive); Braggio et al. 1978; *Gorilla*: HE Freeman & Alcock 1973*; *Orangutan*: HE Freeman & Alcock 1973*; Nadler & Braggio 1974* **CANINE** *Several Species*: Bekoff 1974* **PRIMATE (EXCEPT APE)** *Baboon*: DeVore 1963 (play fighting); Kummer 1968* (play fighting); NW Owens 1975b* (play fighting); *Barbary Macaque*: MacRoberts 1970; *Bonnet Macaque*: Simonds 1974*; *Marmoset*: DH Abbot 1978; *Japanese Macaque*: Modhal & Eaton 1977; Hayaki 1983; GG Eaton et al. 1986*; GG Eaton et al. 1990; *Pigtail Macaque*: Zehr 1998; *Rhesus Macaque*: H Harlow 1965*; Seay 1966; Goy & Phoenix 1971; Loy & Loy 1974; Gard & Meier 1977; *Squirrel Monkey*: Biben 1986 (captive); *Talapoin Monkey*: Wolfheim 1977*; *Vervet Monkey*: Bramblett 1978; Raleigh et al. 1979*; *Multiple Primate (Except Ape) Species*: H Kummer 1974 **RODENT** *Hamster*: Goldman & Swanson 1975; *Marmot*: Nowicki & Armitage 1979; *Rat*: Seward 1945*; Poole & Fish 1976*; Beatty et al. 1981; Meaney & Stewart 1981a; Thor & Holloway 1983*; Thor & Holloway 1984; WW Beatty 1984; CL Moore & Power 1992; LK Smith et al. 1998; *Squirrel*: Holmes 1995; Pasztor et al. 2001 **UNGULATE** *Big Horn Sheep*: Hass & Jenni 1993; *Cattle*: Reinhardt & Reinhardt 1982a*; *Lamb*: Sachs & Harris 1978; *Pig:* MA Berry & Signoret 1984	**PRIMATE (EXCEPT APE)** *Japanese Macaque*: BK Alexander 1970 **RODENT** *Rat*: Seward 1945* (young) **UNGULATE** *Big Horn Sheep*: Berger 1980; *Horse*: Boyd & Houpt 1994	**APE** *Chimpanzee*: J van Lawick-Goodall 1968 (free-living); NE King et al. 1980 (captive); Markus & Croft 1995 (young); Mendoza-Granados & Sommer 1995; *Gorilla*: A Meder 1990 (young, captive); *Orangutan*: Maple 1980 **CANINE** *Wolf*: Traylor 1982 (captive) **MAMMAL** *Harbour Seal*: Renouf & Lawson 1987; *Mongoose*: Wemmer & Flemming 1974; *Sea Lion*: Farentinos 1971; Gentry 1974 **MARSUPIAL** *Kangaroo*: Croft & Snaith 1991; *Opossum*: Fadem & Corbett 1997; *Wallaby*: DM Watson 1993 **MUSTELID** *Ferret*: Stockman et al. 1986 **PRIMATE (EXCEPT APE)** *Baboon*: Kummer 1968* (field study); NW Owens 1975a&b (free-living); Chalmers 1980; Bramblett & Coehlo 1987*; *Barbary Macaque*: Burton 1972; Caine & Mitchell 1979; *Bonnet Macaque*: Simonds 1965; Simonds 1974*; Simonds 1977; *Golden Lion Tamarin*: Kleiman 1979; *Japanese Macaque*: Koyama 1985; Imakawa 1990 (free-living); *Langur*: Dolhinow & Bishop 1970; Poirier 1970; SB Hrdy 1977; *Patas Monkey*: Bramblett 1973; *Pigtail Macaque*: IS Bernstein 1966; IS Bernstein 1970; IS Bernstien 1972; *Rhesus Macaque*: Symons 1978*; *Silver Leaf Monkey*: IS Bernstein 1968; *Squirrel Monkey*: Baldwin 1969; Baldwin & Baldwin 1974; *Stumptail Macaque*: Bertrand 1969; *Syke's Monkey*: Bramblett & Coehlo 1987*; *Vervet Monkey*: Fedigan 1972; Bramblett & Coehlo 1987* **RODENT** *Marmot*: Jamieson & Armitage 1987; *Rat*: Poole & Fish 1976*; Meaney & Stewart 1981b*; Thor & Holloway 1986; Hole 1988; Pellis & Pellis 1990; Pellis & McKenna 1992; *Squirrel*: Waterman 1988; Nunes et al. 1999 (free-living) **UNGULATE** *Cattle*: Brownlee 1954; Reinhardt & Reinhardt 1982a*; Reinhardt 1983; *Black-Tail Deer*: Miller 1975; *Mule Deer*: Linsdale & Tomich 1953
No signif. difference	**PRIMATE (EXCEPT APE)** *Vervet Monkey*: Raleigh et al. 1979* **RODENT** *Rat*: Reinhart et al. 2004		**APE** *Gorilla*: SG Brown 1988 **CANINE** *Several Species*: Biben 1983 (wolf, fox, dog) **FELINE** *Cat*: Caro 1981; Bradshaw 1992 (domestic) **MAMMAL** *Seal*: Harcourt 1991 **PRIMATE (EXCEPT APE)** *Marmoset*: HO Box 1977 (captive); Stevenson & Poole 1982; *Japanese Macaque*: Pavelka 1993 **PROSIMIAN** *Ring-Tailed Lemur*: Gould 1990 (free-ranging) **RODENT** *Mouse*: VA Davies & Kemble 1983; Pellis et al. 2000
Females more		**APE** *Orangutan*: Zucker et al. 1986 (captive)	**PRIMATE (EXCEPT APE)** *Howler Monkey*: Glander 1975; *Rhesus Macaque*: Tomaszycki et al. 2001; *Galago*: Ehrlich 1977

9.5.1.20. Playing Chase and Escape Without Play Fighting

A couple of primate studies of a type of play in which participants chased one another but rarely play-fought after a capture revealed that this type of play was more common among females (Table 9.5.1.20).

Table 9.5.1.20. Playing chase and escape without play fighting.

Nature of Any Difference	Postpubertal
	Adolescent
Males more	
No signif. difference	
Females more	**PRIMATE (EXCEPT APE)** *Olive Baboon*: NW Owens 1975a; *Rhesus Macaque*: Harlow 1969

9.5.1.21. Projective Aggressive Play

Aggression is generally considered a type of behavior that occurs in a social context. Otherwise, aggression is sometimes projected onto an inanimate object that may resemble a social being (such as a doll). A few studies concluded that among preschoolers males were more involved in projective aggressive play than were females (Table 9.5.1.21).

Table 9.5.1.21. Projective aggressive play.

Nature of Any Difference	Sub-adolescent
	Early Childhood
Males more	**NORTH AMERICA** *United States*: Pintler et al. 1946 (playing with dolls); Sears 1951 (playing with dolls); Bach 1945 (playing with dolls); Yarrow 1948 (playing with dolls)
No signif. difference	
Females more	

9.5.2. Sports and Organized Games

Studies of gender differences in involvement in various sports and other organized games are summarized in the following sub-section.

9.5.2.1. Involvement in Sports in General

According to one study, males were more involved in sporting activities than females (Table 9.5.2.1).

Table 9.5.2.1. Involvement in sports in general.

Nature of Any Difference	Postpubertal
	Adolescent
Males more	**NORTH AMERICA** *Canada*: Mandigo et al. 1999
No signif. difference	
Females more	

9.5.2.2. Involvement in Masculine (Versus Feminine) Sports

Some researchers have asserted that most sports can be classified as basically either masculine or feminine. Accordingly, studies have indicated that males are more likely than females to be involved in masculine sports (Table 9.5.2.2).

Table 9.5.2.2. Involvement in masculine versus feminine sports.

Nature of Any Difference	Postpubertal
	Adolescent
Males more	**EUROPE** *Norway*: Klomsten et al. 2005 (soccer, ice hockey, boxing, martial arts) **NORTH AMERICA** *United States*: Eccles & Harold 1991; Fasting 2003; Pfister 1993
No signif. difference	
Females more	

9.5.2.3. Involvement in Feminine (Versus Masculine) Sports

Studies that classified sports into masculine and feminine concluded that females were more likely to be involved in the latter than in the former (Table 9.5.2.3).

Table 9.5.2.3. Involvement in masculine versus feminine sports.

Nature of Any Difference	Postpubertal
	Adolescent
Males more	
No signif. difference	
Females more	**EUROPE** *Norway*: Matteo 1986 (handball); Koivula 1995 **NORTH AMERICA** *United States*: Eccles & Harold 1991; Fasting 2003; Pfister 1993

9.5.2.4. Involvement in Sports Emphasizing Direct Competition

Competitive sports are ones in which there are clear winners and losers. Table 9.5.2.4 indicates that from early childhood onward, males are more likely to engage in competitive sports than are females. This conclusion is consistent with a literature review conducted by Emmott (1985).

Table 9.5.2.4. Involvement in sports emphasizing direct competition.

Nature of Any Dif-ference	Prepubertal		Postpubertal	
	Early Childhood	Childhood	Adolescent	Adult
Males more	**NORTH AMERICA** *United States*: JP Mckee & Leader 1955 (experimental block building task); C Garcia 1994	**ASIA** *Japan*: NHK Public Opinion Research Division 1996* **EUROPE** *Germany*: Scheifler 1913 **NORTH AMERICA** *Canada*: AG Miller & Thomas 1972 (experimental game); Frederick 1995*; *United States*: Lehman & Witty 1930*; DG Freedman 1980; Lever 1976; MA Barnett & Andrews 1977 (experimental game); MC Madsen & Shapira 1970 (experimental game); Lever 1978; Moely et al. 1979 (experimental game); Kirshnit et al. 1989*; Robinson & Bianchi 1997*; Larson et al. 2001	**ASIA** *Japan*: NHK Public Opinion Research Division 1996*; *Soviet Union*: Zuzanek 1980 **NORTH AMERICA** *Canada*: Frederick 1995*; *United States:* Lehman & Witty 1930*; Stoke & West 1931; Lund 1944; Garton & Pratt 1987; Gill 1988; Kirshnit et al. 1989*; Mauldin & Meeks 1990; Robinson & Bianchi 1997*; Larson et al. 1998	**NORTH AMERICA** *Canada*: Hall & Kimura 1995 (college); *United States*: S Flood & Hellstedt 1991 (college)
No signif. difference				
Females more				

9.5.3. Gaming Strategies

A few studies have compared males and females regarding the types of strategies they use when involved in playing games. Findings are reviewed below.

9.5.3.1. Success/Winning-Oriented Strategies

Research undertaken to determine which sex is more likely to devise game strategies that maximize the chances of winning have all concluded that males do so more than do females (Table 9.5.3.1).

Table 9.5.3.1. Success/winning-oriented strategies.

Nature of Any Difference	Prepubertal	Postpubertal	
	Childhood	Adolescent	Adult
Males more	**NORTH AMERICA** *United States*: Lever 1976	**NORTH AMERICA** *United States*: GP Knight & Kagan 1981	**NORTH AMERICA** *United States*: Vinacke 1969:301 (games of "chicken", college); Hottes & Kahn 1974 (young)
No signif. difference			
Females more			

9.5.3.2. Exploitive (Versus Cooperative) Strategies

Some researchers have devised games that allow subjects to either reciprocate or exploit any cooperation exhibited by one's opponent. These studies have all revealed that males are more likely than females to exploit any cooperation by their opponents (Table 9.5.3.2).

Table 9.5.3.2. Use of exploitative (versus cooperative) strategies in experimental games.

Nature of Any Difference	Prepubertal	Postpubertal
	Childhood	Adult
More in males	**NORTH AMERICA** *United States*: Tedeschi et al. 1969a (prisoner's dilemma game)	**NORTH AMERICA** *United States*: JR Bond & Vinacke 1961 (young); Vinacke 1969:305
No signif. difference		
More in females	**NORTH AMERICA** *United States*: Lindskold et al. 1970 (prisoner's dilemma game); Rapoport & Chammah 1965 (prisoner's dilemma game)	

9.5.4. Mass Entertainment

Research having to do with gender differences in accessing mass entertainment options is reviewed in the following section.

9.5.4.1. Watching Television

Studies of sex differences in time spent watching television have either concluded that males do so to a greater extent than females or that there is no significant gender difference (Table 9.5.4.1).

Table 9.5.4.1. Watching television.

Nature of Any Difference	Prepubertal				Postpubertal		
				Childhood	Adolescent	Adult	
Males more				**ASIA** *Japan*: NHK Public Opinion Research Division 1991* **NORTH AMERICA** *United States*: Eron 1963 (aggressive programs); Larson et al. 1989*; Larson et al. 2001*	**ASIA** *Japan*: NHK Public Opinion Research Division 1991* **EUROPE** *Latvia*: Eglite & Zarins 1993 **NORTH AMERICA** *Canada*: Frederick 1995; *United States*: Larson et al. 1989*; Larson et al. 2001*	**EUROPE** *Sweden*: Ahlin 1993 (sporting events)	
No signif. difference				**NORTH AMERICA** *United States*: Long & Henderson 1970; Timmer et al. 1985; Robinson & Bianchi 1997*	**NORTH AMERICA** *United States*: Robinson & Bianchi 1997*; R Lowry et al. 2002		
Females more							

9.5.4.2. Using the Internet/Computers

The majority of studies of sex differences in usage of computers and/or the internet have concluded that males do so to a greater degree than females (Table 9.5.4.2).

Table 9.5.4.2. Using the internet/computers.

Nature of Any Difference					Postpubertal		Multiple Age Categories
					Adolescent	Adult	
Males more					**AISA** *Singapore*: Teo & Lim 2000 **EUROPE** *Britain*: Griffiths 1997 (young); D Kadijevich 2000; A Colley & Comber 2003* (young); *Germany*: Lehmann 1989; Bannert & Arbinger 1996 (use or own computer) **LATIN AMERICA** *Belize*: RL Munroe & Munroe 1994a (Amerindians); RL Munroe et al. 2000* (Amerindians) **MIDDLE EAST** *Israel*: Nachmias et al. 2000 (internet) **NORTH AMERICA** *United States*: L Shashaani 1994 **INTERNATIONAL** *Multiple Countries*: Bartel-Sheehan 1999* (internet); S Levy 1999* (internet)	**ASIA** *Russia:* O Palesh 2004 (college students, men use internet, more particularly for entertainment) **EUROPE** *Scotland*: Durndell 1991 (college) **NORTH AMERICA** *United States*: VA Clarke & Chambers 1989 (college); Durndell & Thomson 1997; Shashaani 1997 (college); Coffin & MacIntyre 1999; Kersteen et al. 1999 (computer programming); Odell et al. 2000 (college); Weiser 2000; A Mitra et al. 2001 (college); Schumacher & Morahan-Martin 2001; **INTERNATIONAL** *Multiple Countries*: Bartel-Sheehan 1999* (internet); S Levy 1999* (internet); LA Jackson et al. 2001* (college)	**EUROPE** *Germany*: Fauser & Schreiber 1989; Frey 1989
No signif. difference					**EUROPE** *Britain*: A Colley & Comber 2003* (older); *Scotland*: Durndell & Thompson 1997 (computers)	**ASIA** *Taiwan*: Fan & Li 2005 **NORTH AMERICA** *United States*: LA Jackson et al. 2001 (communicate more on the internet); LH Shaw & Gant 2002	
Females more						**NORTH AMERICA** *United States*: LA Jackson et al. 2001* (college, communication purposes)	

9.5.4.3. Playing Video Games

The available research indicates that males are more likely than females to play computer games (Table 9.5.4.3).

Table 9.5.4.3. Playing video games.

Nature of Any Difference	Prepubertal				Adolescent	
				Childhood		
Males more				**NORTH AMERICA** *United States*: Funk 1993 (games of a violent nature); Inkpen et al. 1994 (computer games)	**EUROPE** *Britain*: Griffiths 1997 (young) **NORTH AMERICA** *United States*: Morlock et al. 1985; PM Greenfield et al. 1994; Funk & Buchman 1996 (computer games)	
No signif. difference						
Females more						

9.6
AGGRESSION AND THE USE OF FORCE

Aggression is not an easy concept to define. The term refers to behavior that can often cause physical injury or pain to others, although other times it merely results in emotional harm.

9.6.1. Offensive Physical Aggression

Large numbers of studies have been conducted on gender differences in offensive forms of physical aggression, meaning aggression that is essentially non-defensive in nature. Aggression that appears to be sexually motivated will be considered separately.

9.6.1.1a. Offensive Physical Aggression or Aggression in General (Humans, Prepubertal)

Offensive physical aggression involves attacking, hitting, and/or restraining another individual except for aggression that is strictly defensive in nature. Injuries resulting from physical aggression range from momentary feelings of pain to serious cuts and bruises and even death. To measure physical aggression, a variety of operational measures have been used including self-reports, particularly in studying adolescents and adults, as well as observations by teachers and parents, in the case of children. Besides self-reports and reports by parents and teachers, a number of studies have been conducted in laboratory settings in which individuals are provoked into behaving aggressively toward others (e.g., AH Buss & Brock 1963). Still other studies have involved ethnographic observations by anthropologists (e.g., Whiting & Edwards 1973; Munroe et al. 2000).

Inspection of Table 9.6.1.1 reveals that the vast majority of studies have concluded that human males are more likely to be physically aggressive than are females in all societies studied. The few studies that have concluded otherwise have all suggested that the differences simply failed to be statistically significant (usually due to relatively small sample size).

It should be mentioned that gender variations in physical aggression also appear to depend on the gender of one’s opponent. For instance, in a Russian study of 6-7 year olds, children who were allowed to play together in groups of two (dyads), showed that the greatest amount of physical aggression was among boys, and the lowest level was among girls. When boys and girls interacted with each other, levels of physical aggression were usually intermediate, with boys being judged by the adult observers to be the primary initiators (Butovskaya & Kozintsev 1999:129; also see Munroe et al. 2000:18).

With the above qualification, Split-Tables 9.6.1.1a and 9.6.1.1b agree with meta-analyses performed by Eagly and Steffen (1986) and by Bettencourt and Miller (1996) that human males are more physically aggressive than females. These tables add dimensionality to these more conventional forms of meta-analyses by revealing the pan-cultural nature of this generalization.

Split-Table 9.6.1.1a. Offensive physical aggression or aggression in general (humans, prepubertal).

Nature of Any Difference	Prepubertal			
	Infant	Toddler	Early Childhood	Childhood
Males higher	**NORTH AMERICA** *United States*: Zahn-Waxler et al. 1992	**EUROPE** *Britain*: Smith & Green 1975 **NORTH AMERICA** *United States*: Caille 1933; Dawe 1934; Hattwick 1937*; Pintler et al. 1946; J Walters et al. 1957; Pedersen & Bell 1970*; Fagot & Hagan 1985; Tout et al. 1998:1253*	**ASIA** *Russia*: CH Hart et al. 1998 **EUROPE** *Britain*: Blurton Jones & Konner 1973; PK Smith & Green 1975; Hinde et al. 1993; Ahmad & Smith 1994;Tapper & Boultan 2004; *Spain*: Sanchez-Martin et al. 2000; Monks et al. 2002:466 (3-fold difference) **NORTH AMERICA** *Canada*: Ankeney & Goodman 1976; *United States*: Caille 1933 (peer-rated); Dawe 1934 (preschool); Jersild & Markey 1935; RR Sears et al. 1946; Muste & Sharpe 1947; Hattwick 1953*; AE Siegel 1956; Witryol & Calkins 1958 (peer-rated); Durrett 1959; Hartup & Himino 1959; Jegard & Walters 1960; Bandura et al. 1961; Bandura & Walters 1963; Bandura et al. 1963a&b (after observing an aggressive adult model); Beller & Neubauer 1963 (parent-rated); Bandura 1965; RR Sears et al. 1965 (peer-rated); JS Hatfield et al. 1967* (peer-rated); Pedersen & Bell 1970*; JS Hatfield et al. 1967:376* (1-tailed significance test); JM McGuire 1973; Serbin et al. 1973; JW Pearce 1978; Acker & Marton 1984; Cummings et al. 1985; Handal & Hopper 1985; Maccoby & Jacklin 1988; JE Wall & Holden 1994 (Blacks); NR Crick & Grotpeter 1995*; McNeilly-Choque et al. 1996; NR Crick et al. 1997; Tout et al. 1998:1253*; NR Crick et al. 1999*; Russel et al. 2003*; Sebanc 2003; Ostrov et al. 2004; Ostrov & Keating 2004 **OCEANIA** *Australia*: A Russel et al. 2003*	**AFRICA** *Kenya*: Ember 1973:431 (rural); RL Munroe et al. 2000* **ASIA** *China*: Ekblad & Olweus 1986; *Nepal*: RL Munroe et al. 2000*; *Russia*: Butovskaya & Kozintsev 1999:129 **EUROPE** *Britain*: JD Cummings 1944 (teacher ratings); Archer et al. 1988; MJ Boulton 1993; *Finland*: Bjorkqvist et al. 1992; Pulkkinen & Pitkanen 1993* (self-report); Keltikangas-Jarvinen & Pakaslahi 1999 (self-report); *Sweden*: Lagerspetz et al. 1988 (older children); Bjorkquist et al. 1992 (school age) **LATIN AMERICA** *Belize*: RL Munroe & Munroe 1994a (Amer-indians); RL Munroe et al. 2000* (Amer-Indians) **NORTH AMERICA** *United States*: Sheehy 1938; Feshbach 1956 (teacher rating); RR Sears 1961*; PS Sears et al. 1965; AH Buss 1966; RJ Green & Stacey 1967; JS Hatfield et al. 1967; Semler et al. 1967; Semler & Eron 1967; Walker 1967; JD Nelson et al. 1969 (young); Hapkiewicz & Roden 1971 (after watching violent cartoons); MF Martin et al. 1971 (young, after observing an aggressive model); J Roberts & Baird 1972; Hartup 1974 (young); E Maccoby & Jacklin 1975; ME Rice & Grusec 1975; Hold 1976; Harden & Jocob 1978; Puleo 1978 (young, modeled aggression); Bankart & Anderson 1979 (young); Barrett 1979; Brodzinsky et al. 1979; Deluty 1979 (6 to 12 yrs.); Bullock & Merrill 1980; Tieger 1980; Sawin 1981 (after viewing TV violence); Deluty 1983 (4th through 6th grades); Pitcher & Schultz 1983:91; Cairns & Cairns 1984; JL Singer et al. 1984; J Hyde 1984; Deluty 1985 (4th through 6th grades); Cooper & Mackie 1986; Eagly & Steffen 1986; Shantz 1986 (young); Ghodsian-Carpey & Baker 1987:183 (young, opposite-sex twins); Silvern & Williamson 1987 (young, after playing video games); Lancelotta & Vaughn 1989; Renken et al. 1989 (young); Finkelstein et al. 1994; Boyatzis et al. 1995; NR Crick & Grotpeter 1995*; DL Clay et al. 1996 (self-report aggression); NR Crick 1996; NR Crick & Dodge 1996; NR Crick & Grotpeter 1996; McNeilly-Choque et al. 1996; Buntaine & Costenbader 1997; NR Crick 1997 **MIDDLE EAST** *Israel*: Spiro 1958:247 (kibbutz) **OCEANIA** *Samoa*: RL Munroe et al. 2000* **INTERNATIONAL** *Multiple Countries*: Rohner 1976:63* (10 out of 14 cultures); Osterman et al. 1994 (several Western countries); RL Monroe et al. 2000
No signif. difference		**LATIN AMERICA** *Brazil*: C Frey & Hoppe-Graff 1994	**NORTH AMERICA** *United States*: JS Hatfield et al. 1967:376* (2-tailed significance test); NR Crick et al. 1999*	**AFRICA** *Kenya*: Munroe 2003 (Gusii) **NORTH AMERICA** *United States*: RR Sears et al. 1957 (mother's reports); Cairns & Cairns 1984; Huesmann et al. 1992; Buckner & Fivush 1998:417 **INTERNATIONAL** *Multiple Countries*: Rohner 1976:63* (4 out of 14 cultures)
Females higher				

9.6.1.1b. Offensive Physical Aggression or Aggression in General (Humans, Postpubertal and Multiple Ages)

As shown in the Split-Table 9.6.1.1b, the same basic sex difference documented prior to puberty is also found following puberty among humans. Overall, our analysis concurs with other summaries of the literature over the years in concluding that males are more prone toward physical aggression, especially of an offensive nature, than are females (Maccoby & Jacklin 1980; Eagly & Steffen 1986; Hyde 1990; Bettencourt & Miller 1996; Segall et al. 1997; Munroe et al. 2000). Males are particularly aggressive toward other males rather than toward females (Walters et al. 1957).

In terms of age, the present analysis suggests that a significant sex difference is just as great prior to puberty as it is afterward. This generalization is consistent with one reached by MB Harris (1996) on this point, and is inconsistent with Hyde's (1990:701) generalization that the degree of sex difference seems to be greater for young children than for adolescents and adults.

Split-Table 9.6.1.1b. Offensive physical aggression or aggression in general (humans, postpubertal & multiple ages).

Nature of Any Difference	Postpubertal		Multiple Age Categories
	Adolescent	Adult	
Males higher	**ASIA** *China*: WCW Wong et al. 2004:472 **EUROPE** *Denmark*: Lagerspetz et al. 1988; PJ Cook & Laub 1998; *Italy*: Tomada & Schneider 1997:604; *Estonia*: Merenakk et al. 2003:1510 (teacher rating); *Finland*: Pulkkinen & Pitkanen 1993* (self-report); Lindeman et al. 1997 (self-report); *Netherlands*: van der Ende & Verhulst 2005 (self-report and parental reports); *Slovak Republic*: Baumgartner 1995; *Switzerland*: Kuntsche & Klingemann 2004:387 (with peers) **NORTH AMERICA** *United States*: Tryon 1939; Kuhlen & Lee 1943 (enjoy fighting); Lansky et al. 1961; Sears 1961; Titley & Viney 1969; Shortell & Biller 1970 (young); RD Parke & Slaby 1983 (self-report); RJ Johnson & Kaplan 1988; Buss & Perry 1992; Fling et al. 1992; Cotton et al. 1994 (among African-Americans); Durant et al. 1994 (among African-Americans); Hausman et al. 1994; Langhinrichsen-Rohling & Neidig 1995; DL Clay et al. 1996* (self-report aggression); KM Fitzpatrick 1997; Crane-Ross et al. 1998; Carlo et al. 1999; Lahey et al. 2000 (parental reports); CP Flynn 2002:141*; Zakriski et al. 2005 (physically aggressive); Zakriski et al. 2005:849 **OCEANIA** *Guam*: Pinhey et al. 2002	**ASIA** *India*: Prasad 1980 (college); Ujjwala Rani & Ramavani 1989 **EUROPE** *Britain*: J Archer et al. 1995; E Cashdan 1998 (self-report); *Germany*: Muller et al. 1995; *Scotland*: Edmunds 1977 (college) **LATIN AMERICA** *Argentina*: NJ Hines & Fry 1994 **NORTH AMERICA** *Canada*: Jaffe et al. 1974 (college, following sexual arousal); Russell 1981 (college); Bland & Orn 1986; Graham & Wells 2001 (self-report); *United States*: Buss & Durkee 1957 (college); Buss 1961 (college); Sarason 1961 (college); AH Buss 1963 (college); R Epstein 1965 (young); Wyer et al. 1965 (college, self-report); AH Buss 1966a&b (college); SP Taylor & Epstein 1967 (college); Doob & Gross 1968; Fischer et al. 1969 (college); Shuck et al. 1971 (college, after hearing an account of violence); Broverman et al. 1972 (self-report); Gentry 1972 (college, self-report); KS Larsen et al. 1972 (college, administer electric shock); Chase & Mills 1973; MB Harris 1973; Scharff & Schlottmann 1973 (college); Bem 1974 (college, self-report); Unger et al. 1974; MB Harris & Samerotte 1975; Yinon et al. 1975 (college); JL Fisher & Harris 1976 (college); Lando et al. 1977 (college); Gaebelein 1977 (college); Siegman & Dintzer 1977 (college); Huesmann et al. 1978; Spence & Helmreich 1978 (young; self-report); RW Rogers 1980 (college); Doyle & Biaggio 1981 (college); SMS Ahmed 1982 (college); Ruble 1983 (self-report); T Smith 1984; Forsstrom-Cohene & Rosenbaum 1985 (college); Schill et al. 1985 (college); Reinisch & Sanders 1986 (college, hypothetical scenarios); DR Richardson et al. 1986 (college, retaliatory); McCann et al. 1987 (college); Gergen 1990 (college); Schill et al. 1990 (college); Gladue 1991a (college, self-report); Gladue 1991b (college); Scherwitz et al. 1991; Buss & Perry 1992 (college); Harris 1992 (college); Berkowitz 1993; Kopper 1993* (direct hostility); Bjorkqvist et al. 1994b; North et al. 1994 (among homeless adults); Stoney & Engebretson 1994; JW White & Kowalski 1994; Bushman 1995 (college); Giancola & Zeichner 1995 (college, after consuming alcohol); Gladue & Bailey 1995 (self-report); MB Harris 1995 (Anglo and Hispanic, self-report); Hoglund & Nicholson 1995; McCauley 1995:237 (hit when angry, college); Felsten 1996; Gran et al. 1996 (college); MB Harris & Knight-Bohnhoff 1996b:37 (college, hypothetical scenarios); Felson 1996 (more likely to engage in attacks & injure their adversaries); GB West et al. 1996:318 (college, self-report); Green 1998; Bushman et al. 1999 (young); JT Spence & Buckner 2000:49 (self-report); Graham et al. 2004 (self-report); Verona 2005:427 (self-report) **OCEANIA** *Australia*: Homel & Clark 1994 (pubs) **INTERNATIONAL** *Multiple Countries*: Rohner 1976:65* (6 out of 26 countries)	**NORTH AMERICA** *United States*: RR Sears 1961* (peer-rated); JA Gray 1971a:29; Vanfossen 1979 (between the sexes); E Maccoby & Jacklin 1980; McGue et al. 1993; Dykeman et al. 1996 (10-19 yrs.); MB Harris & Miller 2000:845; GM Alexander & Peterson 2004:413 (self-report)
No signif. difference	**ASIA** *Japan*: Tachibana & Hasegawa 1986 **NORTH AMERICA** *United States*: Hurlock 1927; Leifer & Roberts 1972; Cotton et al. 1994 (among African Americans)	**ASIA** *China*: Yamauchi & Li 1995*(college); *India*: Ujjwala Rani & Ramavani 1989; *Japan*: Yamauchi & Li 1995*(college) **EUROPE** *Scotland*: Edmunds & Kendrick 1980 **NORTH AMERICA** *United States*: Deaux 1971; Klesges et al. 1979 (college); Sadowski & Wenzel 1982 (college); Schill et al. 1987 (college); Stets 1990 (among married couples); TJ Allen et al. 1996 **INTERNATIONAL** *Multiple Countries*: Rohner 1976:65* (20 out of 26 countries)	**ASIA** *China*: Wu et al. 2000 **NORTH AMERICA** *United States*: Collins 1973 (3rd, 6th, & 10th grades); Cairns et al. 1989 (4th through 10th grades)
Females higher	**EUROPE** *Britain*: J Warner et al. 2005:294* (scratch others in assaults, 17th & 18th Century)	**EUROPE** *Britain*: J Warner et al. 2005:294* (scratch others in assaults, 17th & 18th Century) **NORTH AMERICA** *United States*: Kopper 1993* (indirect hostility)	

9.6.1.2. Offensive Physical Aggression (Non-Humans, Intraspecific)

Numerous studies have investigated sex differences in intraspecific aggression among a variety of nonhuman species. As shown in Table 9.6.1.2, the majority of these studies indicate that males are more physically aggressive than females. The main exceptions have been among studies of adult rhesus macaques, where females have been found to be more aggressive, especially after receiving experimental injury to their amygdalae.

Table 9.6.1.2. Offensive physical aggression (non-humans, intraspecific).

Nature of Any Difference	Prepubertal				Postpubertal		Multiple Age Categories
	Infant	Toddler	Early Childhood	Childhood	Adolescent	Adult	
Males more	**PRIMATE (EXCEPT APE)** *Rhesus Macaque*: Bernstein & Ehardt 1985*	**PRIMATE (EXCEPT APE)** *Rhesus Macaque*: Harlow & Zimmerman 1973	**PRIMATE (EXCEPT APE)** *Rhesus Macaque*: Reinhardt 1987	**PRIMATE (EXCEPT APE)** *Rhesus Macaque*: Hinde & Spencer-Booth 1967; IS Bernstein & Ehardt 1985*; Lovejoy & Wallen 1988	**APE** *Chimpanzee*: Hebb 1946 **FISH** *Brown Trout*: JI Johnson et al. 2001 **PRIMATE (EXCEPT APE)** *Stumptail Macaque*: Nieuwenhuijsen et al. 1988a (same-sex)	**MARSUPIAL** *Opossum*: BH Fadem et al. 1989 (male territorial intruder) **PRIMATE (EXCEPT APE)** *Japanese Macaque*: Sugiyama 1960; Nieuwenhuijsen et al. 1988c:362*; *Rhesus Macaque*: Altmann 1968; Angermeir et al. 1968; Southwick 1969; Eaton et al. 1981 (young); *Stumptail Macaque*: Bertrand 1969 **RODENT** *Meadow Vole*: Boonstra & Boag 1992; *Mouse*: Fredericson 1950* (pairing with a stranger); Tollman & King 1956; Lagerspetz 1969; Valzelli 1969; Gandelman & vom Saal 1975 (infanticide); Svare et al. 1984a (infanticide); Svare et al. 1984b (infanticide); Palanza et al. 1994; Ferrari et al. 1996:551; *Rat*: JP Seward 1945; SA Barnett 1955; RL Conner & Levine 1969 (in response to foot shock)	**APE** *Chimpanzee*: Van Lawick-Goodall 1968; Goodall 1986:Table 12.2 **FISH** *Salmon*: Keenleyside & Dupuis 1988; Chebanov 1990 **PRIMATE (EXCEPT APE)** *Japanese Macaque*: Nieuwenhuijsen et al. 1988c:363*
No signif. difference	**CANINE** *Spotted Hyena*: Drea et al. 1996					**RODENT** *Mouse*: Fredericson 1950* (surrounding food possession); Fredericson 1952 (over access to food)	
Females more					**RODENT** *Golden Hamster*: L Goldman & Swanson 1975	**MARSUPIAL** *Gray Short-tailed Opossum*: BH Fadem & Corbett 1993a (when paired with a male) **RODENT** *Golden Hamster*: AP Payne & Swanson 1970; Tiefer 1970 **PRIMATE (EXCEPT APE)** *Rhesus Macaque*: Rosvold et al. 1954 (following amygdalar damage); Chance 1956 (among a captive colony); Kling 1974 (following amygdalar damage); IS Bernstein et al. 1993:209	

9.6.1.3. Physical Aggression Involving Drugs and Alcohol

A few studies have sought to determine if drugs – particularly alcohol – increase aggression more in one sex than in the other. All such studies have concluded that male aggression is increased by the use of alcohol more than is female aggression (Table 9.6.1.3).

Table 9.6.1.3. Physical aggression involving drugs and alcohol.

Nature of Any Difference					Adolescent/Adult		
						Adult	
Males more						**EUROPE** *Britain*: K Graham et al. 2004 (alcohol use) **NORTH AMERICA** *United States*: Giancola & Zeichner 1995 (alcohol use); Giancole et al. 2002 (alcohol use)	
No signif. difference							
Females more							

9.6.1.4. Physical Aggression Among Mental Patients

Several studies have sought to determine if male or female mental patients are more likely to behave in a physically aggressive manner. Because these patients cannot be considered close to representative of the populations from which they came, and the display of aggression may have been one of the reasons they were being treated, these studies are given separate attention. Table 9.6.1.4 shows that there are no consistently documented gender differences in the display of physical aggression by persons admitted to mental hospitals.

Table 9.6.1.4. Physical aggression among mental patients.

Nature of Any Difference	Prepubertal	Multiple Age Categories
	Childhood	
Males more	**NORTH AMERICA** *United States*: Kazdin et al. 1987; M Fava et al. 1995	**EUROPE** *Denmark*: S Hodgins et al. 1996; *Finland*: M Eronen et al. 1996 (schizophrenic patients); *Switzerland*: J Modestin & Ammann 1995; *Multiple Scandinavian Countries*: JW Swanson 1994 **MIDDLE EAST** *Israel*: A Stueve & Link 1998; Rabinowitz & Mark 1999:343 (during stay) **NORTH AMERICA** *United States*: WN Adler et al. 1983 (during stay); Tardiff 1984 (before admission)
No signif. difference	**NORTH AMERICA** *United States*: Connor et al. 2003 (proactive & reactive aggression)	**EUROPE** *Britain*: DV James et al. 1990 (during stay); *Sweden*: Palmstierna & Wistedt 1989 (during stay) **NORTH AMERICA** *United States*: Tardiff & Sweillam 1982 (during stay); Tardiff 1984; Hodgkinson et al. 1985 (during stay); JG Edwards et al. 1988 (during stay); Binder & McNiel 1990; Blomhoff et al. 1990 (during stay); RJ Miller et al. 1993 (during stay); HJ Steadman et al. 1994; Tam et al. 1996; Tardiff et al. 1997 (before admission); Hiday et al. 1998
Females more		**EUROPE** *Britain*: Fottrell 1980 (during stay) **NORTH AMERICA** *United States*: Binder & McNiel 1990 (during stay)

9.6.1.5. Experimentally Induced Aggression

Despite ethical reservations, various types of aggression have been experimentally induced for the purpose of better understanding the phenomenon. As shown in Table 9.6.1.5, most of these studies have concluded that males are more likely than females to behave aggressively under a variety of experimental conditions, a conclusion that was also reached in a meta-analysis by Bettencourt & Miller (1996).

Table 9.6.1.5. Experimentally induced aggression.

Nature of Any Difference	Prepubertal		Postpubertal
	Early Childhood	Childhood	Adult
Males more		**NORTH AMERICA** *United States*: Spache 1951* (projective test toward peers); AH Buss 1963 (young, lab); Epstein 1965 (lab); AH Buss 1966a&b (lab); SP Taylor & Epstein 1967* (lab); Edwards 1968 (lab); Youssef 1968 (lab); Titley & Viney 1969 (lab); Schuck et al. 1971 (lab); Larsen et al. 1972* (young, lab); Scharff & Schlottman 1973 (lab); Jaffe et al. 1974 (lab); Raden 1974 (young, lab); Konecni 1975 (young, lab); Yinon et al. 1975 (lab); Hedrick 1977 (lab); Lando et al. 1977* (lab); Siegman & Dintzer 1977 (lab); Frodi 1978 (lab); Lando & Donnerstein 1978 (lab); Hynan et al. 1980 (lab); Rogers 1980 (lab); Hynan & Esselman 1981 (lab); Ahmed 1982 (field); Hynan 1982 (lab)	**NORTH AMERICA** *United States*: AH Buss & Brock 1963 (college, experimental shocking an experimental subject); SP Taylor & Epstein 1967* (shocking an experimental opponent); Lando et al. 1977* (shocking an experimental opponent)
No signif. difference	**NORTH AMERICA** *United States*: JP McKee & Leader 1955 (experimental study)	**NORTH AMERICA** *United States*: Larsen et al. 1972* (young, lab)	**NORTH AMERICA** *United States*: SP Taylor & Epstein 1967* (shocking an experimental opponent after provocation); Larsen et al. 1972* (shocking an opponent in an experiment); Lando et al. 1977 (monetary subtraction was substituted for shock); DR Richardson et al. 1986 (college, shocking an experimental opponent)
Females more		**NORTH AMERICA** *United States*: Spache 1951* (projective test toward adults); Heacock et al. 1975 (college, following an electric shock)	**RODENT** *Rat*: DC Blanchard et al. 1980 (without a tail shock); DC Blanchard et al. 1991 (when stimulated with cat odor)

9.6.1.6. Individual Aggression Toward "Outsiders"

Aggression toward "outsiders" (albeit within one's own species) by individuals (or at least by small groups of individuals) often entails apparently impulsive attacks. In the two species of primates in which these attacks were scientifically observed, males were the main attackers (Table 9.6.1.6).

Table 9.6.1.6. Individual aggression toward "outsiders".

Nature of Any Difference	Multiple Age Categories
Males more	**APE** *Gorilla*: Sabater 1966 **PRIMATE (EXCEPT APE)** *Bushbaby*: Doyle 1974
No signif. difference	
Females more	

9.6.1.7. Biting Others During Aggression

One study of macaques concluded that females were more likely than males to incorporate biting into their displays of aggression (Table 9.6.1.7).

Table 9.6.1.7. Biting others during aggression.

Nature of Any Difference						
						Adult
Males more						
No signif. difference						
Females more						**PRIMATE (EXCEPT APE)** *Rhesus Macaque*: Bernstein & Ehardt 1985

9.6.1.8. Combative Involvement in Warfare

Involvement in warfare as a combatant is usually assessed based on information provided by military organizations. As shown in Table 9.6.1.8, all studies have found that males are the primary combatants in warfare.

Table 9.6.1.8. Combative involvement in warfare.

Nature of Any Difference					Postpubertal		Multiple Age Categories
						Adult	
Males more						**INTERNATIONAL** *Multiple Preliterate Societies*: Whyte 1978:217 (70 out of 70 societies)	**MIDDLE EAST** *Israel*: Dimitrovsky et al. 1989; AR Bloom 1993 **NORTH AMERICA** *United States*: Murdoch et al. 2003 (military)
No signif. difference							
Females more							

9.6.1.9. Aggression Toward Females

Studies of aggression directed specifically toward females have reached various conclusions, perhaps depending upon the species being investigated. In the case of humans, one study found that males were more likely than females to attack females, whereas no sex difference was identified in zebra finches. Several studies of fish, on the other hand, have concluded that females are more likely to display aggression toward other females than are males (Table 9.6.1.9).

Table 9.6.1.9. Physical aggression toward females.

Nature of Any Difference							Multiple Age Categories
						Adult	
Males engage in more						**NORTH AMERICA** *United States*: Christopher et al. 1998	
No signif. difference							**BIRD** *Zebra Finch*: Adkins-Regan & Robinson 1993
Females engage in more							**FISH** *Black Chinned Tilapia*: Balshine-Earn & McAndrew 1995 (same sex rivals during courtship); *Cardinal fish*: Kuwamura 1985 (same sex rivals during courtship); Okuda 1999 (same sex rivals during courtship); *Salmon*: AJ Hanson & Smith 1967; Flemming & Gross 1993; Okuda & Yanagisawa 1996 (same sex rivals during courtship); TP Quinn 1999:194; *Tidewater Goby*: RO Swenson 1997 (same sex rivals during courtship)

9.6.1.10. Aggression Toward Males

As a companion to the above table on aggression toward conspecific females, some research has also investigated sex differences in aggression toward conspecific males among various species. Findings have concluded that males receive more aggression than do females, with the exception of zebra finches in which no significant sex difference was found (Table 9.6.1.10).

Table 9.6.1.10. Aggression toward males.

Nature of Any Difference							
					Postpubertal		Multiple Age Categories
						Adult	
Males engage in more						**RODENT** *House Mouse*: Palanza et al. 1996	**AMPHIBIAN** *Green Dart Poison Frog*: K Summers 1992 (same sex rivals during courtship) **FISH** *Salmon*: AJ Hanson & Smith 1967; Keenleyside & Dupuis 1988; Flemming & Gross 1993; TP Quinn 1999:194 **REPTILE** *Anolis Lizard*: TA Jenssen et al. 2000 (aggressive signaling to same-sex rival during courtship)
No signif. difference						**BIRD** *Zebra Finch*: Adkins-Regan & Robinson 1993	
Females engage in more							

9.6.1.11. Aggression Motivated by Emotions

The few studies of aggression specifically motivated by emotions suggest that there are no significant sex differences (Table 9.6.1.11).

Table 9.6.1.11. Aggression motivated by emotions

Nature of Any Dif-ference						
					Postpubertal	
						Adult
Males more						
No signif. difference						**NORTH AMERICA** *United States*: SP Thomas 1989 (anger); Guerrer 1994 (anger, self report); Guerrero & Reiter 1998 (anger, self report)
Females more						

9.6.1.12. Animal Cruelty

One study of sex differences in cruelty to animals concluded that this trait was more common among males than among females (Table 9.6.1.12).

Table 9.6.1.12. Animal cruelty.

Nature of Any Difference						
					Postpubertal	
						Adult
Males more						**NORTH AMERICA** *United States*: Arlike & Luke 1997; KS Miller & Knutson 1997; Flynn 1999:975 (college, self-reported childhood behavior); CP Flynn 2002:141 (college, self-reported childhood behavior)
No signif. difference						
Females more						

9.6.1.13. Types of Instruments Used in Aggression

One study of sex differences in the type of instruments used in the commission of violence concluded that knives and other pointed instruments were used in a greater proportion of cases by males than by females (Table 9.6.1.13).

Table 9.6.1.13. Types of instruments used in aggression.

Nature of Any Difference							Multiple Age Categories
Males more							**EUROPE** *Britain*: J Warner et al. 2005:294 (knives & other pointed instruments, 17th & 18th Centuries)
No signif. difference							
Females more							

9.6.2. Non-Physical Aggression

Most forms of nonphysical aggression are verbal in nature, such as shouting and cursing at one's opponent. Other forms of aggression are so-called displaced aggression, meaning aggression that is directed toward someone or something other than the provocateur. Measurement of such aggression is primarily based on self-reports or reports from teachers or parents.

9.6.2.1. Indirect (Displaced) Aggression (e.g., Slamming Doors, Throwing Things)

Research concerning aggression that damages objects or makes noise rather than injuring opponents has been termed indirect or displaced aggression. Table 9.6.2.1 indicates that there are no consistent sex differences in the pattern with respect to which sex is most likely to exhibit such aggression, although there may be tendencies for sex differences to vary depending on the age category being studied.

Table 9.6.2.1. Indirect (displaced) aggression (e.g., slamming doors, throwing things).

Nature of Any Difference	Prepubertal				Postpubertal		Multiple Age Categories
			Early Childhood	Childhood	Adolescent	Adult	
Males more			**EUROPE** *Britain*: T Moore & Ucko 1961 (toward dolls) **NORTH AMERICA** *United States*: Bach 1945 (toward dolls); Pintler et al. 1946 (toward dolls); PS Sears 1951 (toward dolls); Bandura et al. 1961 (toward bobo dolls)	**EUROPE** *Britain*: Tapper & Boulton 2000 **NORTH AMERICA** *United States*: WC Olson 1930	**EUROPE** *Britain*: J Archer et al. 1995; *Slovak Republic*: Baumgartner 1995 **NORTH AMERICA** *United States*: PW Jackson & Lahaderne 1967; Doob & Gross 1968 (field, horn honking); Fischer et al. 1969 (young, lab); Deaux 1971 (field, horn honking); Chase & Mills 1973 (field, horn honking); TL Good et al. 1973; Harris 1973 (field); PC Lee 1973; PC Lee & Wolinsky 1973; Buvinic 1975 (young, lab); Hedrick 1977 (young, lab)	**ASIA** *India*: Prasad 1980 (college) **EUROPE** *Finland*: Bjorkqvist et al. 1994* (rational-appearing aggression)	**NORTH AMERICA** *United States*: CW Turner et al. 1975* (aggressive horn honking)
No signif. difference				**INTERNATIONAL** *Multiple Countries*: Osterman et al. 1994 (several European and North American countries)		**ASIA** *India*: Ujjwala Rani & Ramavani 1989 **EUROPE** *Germany*: Muller 1991; Muller et al. 1995 **NORTH AMERICA** *Canada*: Russell 1981 (college); *United States*: Buss & Durkee 1957 (college); Buss 1961 (college); Sarason 1961 (college); Green et al. 1996 (college); McCann et al. 1987 (college); Kopper 1993	
Females more			**NORTH AMERICA** *United States*: Crick at al. 1999 (verbally, rationally)	**EUROPE** *Britain*: J Archer & Westeman 1981; J Archer et al. 1988 **NORTH AMERICA** *United States*: Lagerspetz et al. 1988; Cairns et al. 1989; Bjorkqvist et al. 1992	**NORTH AMERICA** *United States*: CW Turner et al. 1975* (field, horn honking)	**EUROPE** *Finland*: Bjorkqvist et al. 1994* (social manipulation); *Scotland*: Edmunds 1977 (college) **LATIN AMERICA** *Argentina*: NJ Hines & Fry 1994 **NORTH AMERICA** *United States*: Guerrero & Reiter 1988:332 (college; self-reported passive aggression); Guerrero 1994 (self-reported passive aggression); Guerrero & Reiter 1998 (passive aggression)	

9.6.2.2. Direct Verbal Aggression

Direct verbal aggression refers to behavior that personally insults and taunts an opponent. Split-Table 9.6.2.2a provides a mixed picture regarding sex differences in such aggression, although most studies suggest that boys surpass girls.

Split-Table 9.6.2.2a. Direct verbal aggression (prepubertals).

Nature of Any Difference	Prepubertal					
			Early Childhood	Childhood		
Males more			**NORTH AMERICA** *Canada*: Ankeney & Goodman 1976; *United States*: Dawe 1934; JS Hatfield et al. 1967:376; Ostrov & Keating 2004 (toward other males)	**EUROPE** *Britain*: Tapper & Boulton 2000 **NORTH AMERICA** *United States*: Mueller & Donnerstein 1977 (lab); Bullock & Merrill 1980; Achenbach & Edelbrock 1981:14*; Bredemeir et al. 1986; Ghodsian-Carpey & Baker 1987 (young); Renken et al. 1989 (young); D Wright et al. 1992; Finkelstein et al. 1994; Clay et al. 1996; Erdley & Asher 1998		
No signif. difference			**NORTH AMERICA** *United States*: JP McKee & Leader 1955	**INTERNATIONAL** *Multiple Countries*: Osterman et al. 1994 (several European and North American countries)		
Females more			**NORTH AMERICA** *United States*: Jersild & Markey 1935; Durrett 1959	**EUROPE** *Britain:* Archer et al. 1988; Ostermann et al. 1998 **NORTH AMERICA** *United States*: Xie et al. 2003		

Among adolescents, the proportion of studies finding sex differences are almost equally split in terms of suggesting that males or females are more involved in direct verbal aggression. In the case of adults, however, the preponderance of evidence tilts more toward there either being no significant sex difference or males surpassing females in such behavior (Split-Table 9.6.2.2b).

Split-Table 9.6.2.2b. Direct verbal aggression (postpubertals).

Nature of Any Difference					Postpubertal		Multiple Age Categories
					Adolescent	Adult	
Males more					**ASIA** *Japan*: Harman et al. 1990* (young) **EUROPE** *Slovak Republic*: Baumgartner 1995 **NORTH AMERICA** *United States*: WD Gentry 1972; Achenbach & Edelbrock 1981:14*; AH Buss & Perry 1992*; Fling et al. 1992; Crane-Ross et al. 1998	**ASIA** *Japan*: Harman et al. 1990* (college); *India*: Prasad 1980 (college); Ujjwala Rani & Ramavani 1989 **EUROPE** *Britain*: J Archer et al. 1995 (college); Archer et al. 1997 (young); *Finland*: Sallinen-Kuparinen et al. 1991 (college) **LATIN AMERICA** *Argentina*: NJ Hines & Fry 1994 **NORTH AMERICA** *Canada*: Russell 1981 (college); *United States*: Strodtbeck & Mann 1956; Buss 1961 (college); Sarason 1961 (college); Doob & Gross 1968; Fischer et al. 1969 (young, lab); CW Turner et al. 1975; Gaebelein 1977 (young, lab); Lefkowitz et al. 1978 (college); Finchum & Freitag 1979 (young); Roloff & Greenberg 1979 (young); Greenglass & Julkunen 1989; Schill et al. 1990 (college); Gladue 1991a (college); Gladue 1991b (college); AH Buss & Perry 1992* (college); MB Harris 1992b (college); MS Stanford et al. 1995; LR Green et al. 1996; Bernstein & Gesn 1997 (college); JA Harris 1997 (college); Manuck et al. 1998 (middle-age); Wann et al. 1999	
No signif. difference					**EUROPE** *Finland*: Bjorkqvist et al. 1992	**EUROPE** *Germany*: Muller et al. 1995; *Scotland*: Edmunds 1977 (college) **NORTH AMERICA** *United States*: Buss & Durkee 1957 (college); DB Leventhal et al. 1968 (college); Atkinson & Polivy 1976* (young); Fisher & Harris 1976 (young, lab); Harris & Klingbeil 1976 (field); Golin & Romanowski 1977 (young, lab); Koerner 1977* (young, lab); Doyle & Biaggio 1981 (college); Reinisch & Sanders 1986 (college); McCann et al. 1987 (college); Stets 1990 (among married couples); Kopper 1993; Driscoll & Yankeelov 1995 (young); MB Harris & Knight-Bohnhoff 1996b:37 (college, hypothetical scenarios); Verona 2005:427 (self report)	**NORTH AMERICA** *United States*: Cairns et al. 1984 (4th through 10th grades)
Females more					**NORTH AMERICA** *United States*: Zakriski et al. 2005:849* (in reaction to adult warnings); Zakriski et al. 2005:849* (in reaction to adult warnings, mean age 12.5); Zakriski et al. 2005:849* (in reaction to adult punishment)	**NORTH AMERICA** *United States*: Worthing et al. 1973 (college); Atkinson & Polivy 1976* (young, lab); Prerost 1976 (college); Koerner 1977* (young, lab); Lando et al. 1977 (young, lab); Klesges et al. 1979 (college)	

9.6.2.3. Indirect Verbal Aggression (Relational Aggression)

Indirect verbal aggression (or relational aggression) pertains to behavior that insults an opponent "behind his/her back" or that threatens to withhold or withdraw positive relationships with someone. Most studies of indirect verbal aggression have concluded that females engage in this activity more than do males (Table 9.6.2.3).

Table 9.6.2.3. Indirect verbal aggression (relational aggression).

Nature of Any Difference	Prepubertal		Postpubertal	
	Early Childhood	Childhood	Adolescent	Adult
Males more		**EUROPE** *Italy*: Tomada & Schneider 1997*		
No signif. difference	**EUROPE** *Britain*: K Tapper Boulton 2004* (3 & 6 year olds)	**EUROPE** *Poland*: K Osterman et al. 1994* (peer/teacher reports); *Italy*: G Tomada & Schneider 1997* (peer/teacher reports) **OCEANIA** *Australia*: L Owens & MacMullin 1995 (peer/teacher reports)	**NORTH AMERICA** *United States*: SA Paquette & Underwood 1999 (young)	
Females more	**ASIA** *Russia*: CH Hart et al. 1998 **EUROPE** *Britain*: K Tapper Boulton 2004* (3 & 6 year olds, self & peer reports) **NORTH AMERICA** *United States*: MK McNeilly-Choque et al. 1996; NR Crick et al. 1997; Bonica et al. 2003; A Russel et al. 2003; Sebanc 2003; JM Ostrov et al. 2004; Ostrov & Keating 2004; JE Burr et al. 2005 **OCEANIA** *Australia*: A Russell et al. 2003*	**EUROPE** *Britain*: Y Ahmad & Smith 1994*; *Finland*: K Björkqvist 1992 (9-11 years old, peer/teacher reports); K Lagerspetz & Björkqvist 1994 (9-11 years old, peer/teacher reports); K Osterman et al. 1994* (peer/teacher reports) **NORTH AMERICA** *United States*: K Osterman et al. 1994* (peer/teacher report); NR Crick & Grotpeter 1995 (relationally aggressive, peer/teacher reports); NR Crick 1996; NR Crick et al. 1996 (≤ 11 years old, peer/teacher reports); McNeilly-Choque et al. 1996; Crick 1997; Galen & Underwood 1997; A Russell et al. 2003* **OCEANIA** *Australia*: A Russell et al. 2003*	**NORTH AMERICA** *United States*: Tomada & Schneider 1997*	**EUROPE** *Britain*: A Campbell et al. 1997 (college, questionnaire); *Sweden*: Bjorkqvist et al. 1994b **NORTH AMERICA** *United States*: Werner & Crick 1999 (college)

9.6.2.4. Aggression in Response to Vicarious Experiences of Aggression (Modeled Aggression)

As noted earlier, males are more offensively physically aggressive than females under a variety of circumstances. A related issue has to do with how much witnessing aggression increases the probability of aggression by males and females. For example, are there sex differences in the effects of watching violent television programs on subsequent aggression?

To address such questions, researchers have used a variety of methods, most of which are experimental in nature. For instance, children have been randomly divided into two groups, with one group given access to a violent video game, while the other group is only allowed to play a non-violent video game. Following equal amounts of play, subjects are given opportunities to be aggressive toward other children under the watchful eyes of researchers (Cooper & Mackie 1986). To assess the effects of similar experiences by adults, researchers have sometimes used questionnaires in which aggression-provoking situations are described and subjects are asked to report their most probable responses.

Table 9.6.2.4 shows that increased aggression following vicariously observing or engaging in simulated violence has been mixed with respect to any gender differences. Generally, among school age children, females appear to be more likely to display aggression in response to vicarious aggressive experiences, but males may do so more in adulthood.

Table 9.6.2.4. Aggression in response to vicarious experiences of aggression (modeled aggression).

Nature of Any Difference	Prepubertal	Postpubertal
	Childhood	Adult
Males more		**NORTH AMERICA** *United States*: Harris & Samerotte 1975 (field); Bartholow & Anderson 2002 (college, video games)
No signif. difference		**NORTH AMERICA** *United States*: Anderson & Dill 2000 (college, video games)
Females more	**NORTH AMERICA** *United States*: Cooper & Mackie 1986 (older, video games); Silvern & Williamson 1987 (young, video games); Schutte et al. 1988 (young, video games)	

9.6.2.5. Instrumentally Motivated Aggression

Aggression that is undertaken with clear personal objectives to be achieved has been investigated in a couple of studies with respect to sex differences. Both studies concluded that instrumentally motivated aggression was more common in males than females (Table 9.6.2.5).

Table 9.6.2.5. Instrumentally motivated aggression.

Nature of Any Difference	Prepubertal	Postpubertal
	Childhood	Adult
Males more instrumental	**NORTH AMERICA** *United States*: J Archer & Parker 1994	**NORTH AMERICA** *United States*: A Campbell et al. 1993a
No signif. difference		
Females more instrumenal		

9.6.2.6. Reconciling (or Attempting to Reconcile) After a Conflict

Reconciling behavior involves attempting to restore a relationship back to its pre-conflict state, and possibly even improve it (Sackin & Thelen 1984; de Waal 1993). In humans, it is often accompanied by apologies and asking for forgiveness (Sackin & Thelen 1984), whereas in other animals, particularly other primates, one often sees this behavior coinciding with bowing and attempting to touch and kiss the extremities of the prior opponent (de Waal 1993). In both human children and nonhuman primates, if reconciling behavior occurs, it nearly always occurs within one or two minutes of the end of the conflict (Butovskaya & Kozintsev 1999:135). The very limited research currently available on gender differences in reconciling behavior following a conflict between acquaintances suggests there is no difference (Table 9.6.2.6).

Table 9.6.2.6. Reconciling (or attempting to reconcile) after a conflict.

Nature of Any Difference	Prepubertal	Postpubertal
	Childhood	Adolescent
Males more		
No signif. difference	**ASIA** *Russia*: Butovskaya & Kozintsev 1999	
Females more		**NORTH AMERICA** *United States*: Lindeman et al. 1997 (linguistic means); KA Black 2000 (linguistic means)

9.6.3. Pushy/Bullying Behavior

Studies that have compared males and females in the use of pushy and bullying types of behavior are summarized in the following tables.

9.6.3.1. Bullying Behavior

Bullying behavior consists of a combination of persistent harassment and violence toward another person. As summarized in Table 9.6.3.1, research has consistently revealed that bullying behavior is more common among males than among females.

Table 9.6.3.1. Bullying behavior.

Nature of Any Difference	Prepubertal	Postpubertal
	Childhood	Adolescent
Males more	**EUROPE** *Italy*: Baldry & Farrington 1999 **OCEANIA** *Australia*: Forero et al. 1999	**EUROPE** *Britain*: Ahmad & Smith 1993; I Whitney & Smith 1993; *Denmark*: Lagerspetz et al. 1982; *Switzerland*: Kuntsche & Klingemann 2004:387 **MIDDLE EAST** *Israel*: Gofin et al. 2002:175
No signif. difference	**EUROPE** *Britain*: Young & Sweeting 2004* (bullying characteristics)	**EUROPE** *Britain*: Young & Sweeting 2004* (bullying characteristics)
Females more		

9.6.3.2. Using Physical Force to Get One's Way

Using physical force to get one's way often overlaps with the mere use of aggression and violence. However, whereas aggression and violence nearly always involve inflicting sudden physical pain and potential injury on a victim, the use of physical force can also include the gradual use of torture (such as twisting a victim's arm or stepping on their fingers). Table 9.6.3.2 shows that males have been found to be more likely than females to use such physically forceful tactics.

Table 9.6.3.2. Using physical force to get one's way.

Nature of Any Difference	Prepubertal	Postpubertal
	Early Childhood	Adult
Males more	**NORTH AMERICA** *United States*: WR Charlesworth & Dzur 1987	**EUROPE** *Britain*: J Archer & Parker 1994; J Archer & Haigh 1999 **NORTH AMERICA** *United States*: A Campbell et al. 1992 (young, gain compliance); A Campbell et al. 1993 (young); Campbell & Muncer 1994 (gain compliance); Green 1998 (gain compliance)
No signif. difference		
Females more		

9.6.3.3. Teasing

Teasing involved making fun of another person. As shown in Table 9.6.3.3, the available research indicates that males engage in teasing more than do females.

Table 9.6.3.3. Teasing.

Nature of Any Difference	Prepubertal	Postpubertal
	Early Childhood	Adult
Males more	**NORTH AMERICA** *United States*: Berne 1930 (teasing peers)	**NORTH AMERICA** *United States*: Luthar et al. 1996:182 (opiate addicts, retrospective childhood recollections)
No signif. difference		
Females more		

9.6.4. Defensive/Prosocial Aggression

Aggression that has as its goal either self-defense or defense of others has sometimes received special research attention. The findings from these studies with respect to sex differences are reviewed below.

9.6.4.1. Aggression in Self-Defense or Territorial Defense

All of the research on aggression involving defense of self or of one's territory have involved nonhuman animals. Table 9.6.4.1 shows that these studies have reached very mixed conclusions with regard to any sex differences.

Table 9.6.4.1. Aggression in self defense or territorial defense.

Nature of Any Difference		Postpubertal		Multiple Age Categories
	Childhood	Adolescent	Adult	
Males more		**RODENT** *Ground Squirrel*: CL Arenz & Leger 1997 (field)	**AMPHIBIAN** *Salamander*: EB Wiltenmuth 1996 (more likely to attack intruders) **PRIMATE (EXCEPT APE)** *Macaque*: M Cooper & Berstein 2000 (counter-attack); *White-Fronted Capuchin Monkey*: L Gould et al. 1997 (field)	**PRIMATE (EXCEPT APE)** *Macaque*: M Cooper & Bernstein 2000 (especially if initiator was female)
No signif. difference	**RODENT** *Ground Squirrel*: CL Arenz & Leger 1997* (field)	**CRUSTACEAN** *Red Swamp Crayfish*: MH Figler et al. 1999 (territory holders of either sex are equally likely to attack intruders) **RODENT** *Ground Squirrel*: CL Arenz & Leger 1997* (field)	**CRUSTACEAN** *Hermit Crab*: MD Absher et al. 2001 (in competition for gaining access to a new shell for latency to attack or duration of fights) **PRIMATE (EXCEPT APE)** *Ring-Tailed Lemur*: L Gould 1996 (field); L Gould et al. 1997 (field) **RODENT** *Ground Squirrel*: CL Arenz & Leger 1997* (field)	
Females more			**CRUSTACEAN** *Snapping Shrimp*: M Hughes 1996 (respond to intruders of any size) **RODENT** *Golden Hamster*: DM Marques et al. 1977 (with territories more likely to initiate attacks sooner and with greater intensity when confronted with an intruder); *Rat*: RJ Blanchard et al. 1993 (defensive when threatened)	

9.6.4.2. Aggression in Defense of Others

The studies of aggression that appear to be specifically in defense is limited to nonhuman species, and they provide a very inconsistent picture with respect to any gender differences (Table 9.6.4.2).

Table 9.6.4.2. Aggression in defense of others.

Nature of Any Difference	Prepubertal				Postpubertal		Multiple Age Categories
				Childhood	Adolescent	Adult	
Males more						**PRIMATE (EXCEPT APE)** *White-Fronted Capuchin Monkey*: L Gould et al. 1997 (field)	**APE** *Chimpanzee*: J Goodall 1968a&b **PRIMATE (EXCEPT APE)** *Chacma Baboon*: WJ Hamilton et al. 1975
No signif. difference				**RODENT** *Ground Squirrel*: CL Arenz & Leger 1997* (field)	**RODENT** *Ground Squirrel*: CL Arenz & Leger 1997* (field)	**PRIMATE (EXCEPT APE)** *Ring-Tailed Lemur*: L Gould 1996 (field); L Gould et al. 1997 (field) **RODENT** *Ground Squirrel*: CL Arenz & Leger 1997* (field)	
Females more							**PRIMATE (EXCEPT APE)** *Rhesus Macaque*: JR Kaplan et al. 1987:293 (defense of relatives); IS Bernstein & Ehardt 1985:49 (defense of relatives)

9.6.4.3. Aggression to Maintain Social Order

Aggression undertaken for the purpose of maintaining basic social order has been found to be more common among females than among males (Table 9.6.4.3).

Table 9.6.4.3. Aggression to maintain social order.

Nature of Any Difference	Prepubertal					
			Early Childhood	Childhood		
Males more						
No signif. difference						
Females more			**NORTH AMERICA** *United States*: EZ Johnson 1951; Pitcher & Prelinger 1963	**NORTH AMERICA** *United States*: RR Sears 1961		

9.7
SEXUALITY AND PAIR BONDING

While they are closely related phenomena, sexuality and pair bonding can be distinguished in terms of their relationship to reproduction. Whereas sexuality refers to the activities that are essential to the production of new offspring, pair bonding refers to the formation of emotional commitments between sex partners and to the offspring they jointly produce.

9.7.1. Sexual Behavior

Sexual behavior is difficult to precisely define but generally involves the events preceding copulation. The numerous studies of gender differences in such behavior are reviewed in the following tables.

9.7.1.1. Competing for Mates

Two studies of fish concluded that females spent more time and energy competing for mates than was the case for males (Table 9.7.1.1).

Table 9.7.1.1. Competing for mates.

Nature of Any Difference	Postpubertal
	Adult
Males more	
No signif. difference	
Females more	**FISH** *Pipe Fish*: Berglund et al. 2001; Berglund et al. 2005

9.7.1.2. Flirting

According to one study, females engage in more flirting behavior than was true for males (Table 9.7.1.2).

Table 9.7.1.2. Flirting.

Nature of Any Difference	Prepubertal
	Early Childhood
Males more	
No signif. difference	
Females more	**EUROPE** *Finland*: NK Sandnabba et al. 2003

9.7.1.3. Premarital Petting

A few studies of premarital petting (usually based on self-reports) have usually concluded that males report doing so more than females, although one study failed to find any statistically significant difference (Table 9.7.1.3).

Table 9.7.1.3. Premarital petting.

Nature of Any Difference	Postpubertal	Multiple Age Categories
	Adult	
Males more	**NORTH AMERICA** *United States*: Huang & Uba 1992 (young, Chinese students)	**NORTH AMERICA** *United States*: Herold & Mewhinney 1993 (with someone they met on the same day); Laumann et al. 1994:239 (acquaintances)
No signif. difference	**NORTH AMERICA** *Canada*: Meston et al. 1996 (young)	
Females more		

9.7.1.4. Initiation of Dating

Taking the initiative in asking a member of the opposite sex for a date (often the beginning of a romantic relationship) has been the subject of scientific investigation only to a limited extent. The research indicates that males are more likely than females to take the initiative (Table 9.7.1.4).

Table 9.7.1.4. Initiation of dating.

Nature of Any Difference	Multiple Age Categories
Males more	**NORTH AMERICA** *United States*: BL Bailey 1988; Cate & Lloyd 1992
No signif. difference	
Females more	

9.7.1.5. Age of First Dating Experience

The two studies located on which sex began dating at the earliest average age reached contradictory conclusions (Table 9.7.1.5).

Table 9.7.1.5. Age of first dating experience.

Nature of Any Difference	Postpubertal
	Adolescent
Males younger	**NORTH AMERICA** *United States*: PC Regan et al. 2004
No signif. difference	
Females younger	**NORTH AMERICA** *United States*: D Offer 1969:80

9.7.1.6. Initiating, or Attempting to Initiate, Sexual Intimacy

All of the available research on which sex is most likely to initiate, or attempt to initiate, sexual intimacy has concluded that males surpass females in this regard (Table 9.7.1.6).

Table 9.7.1.6. Initiating, or attempting to initiate, sexual intimacy.

Nature of Any Difference					Postpubertal		Multiple Age Categories
						Adult	
Males more						**NORTH AMERICA** *United States*: McCormick 1979 (young); Peplau et al. 1977 (young); LaPlante et al. 1980 (college); M Brown & Auerback 1981 (married couples); Byers & Heinlein 1989* (married couples); RD Clark & Hatfield 1989; O'Sullivan & Byers 1992 (college, dating couples); Lottes 1993; Bartling & Eisenman 1994:73; Hogben & Waterman 2000; Zurbriggen 2000; Struckman-Johnson et al. 2003 (coercive)	**NORTH AMERICA** *United States*: Byers & Heinlein 1989 (cohabitating couples)
No signif. difference							
Females more							

9.7.1.7. Initiating Unwelcome/Unwanted Sexual Behavior

Males have been found to be more likely than females to initiate unwelcome or unwanted sexual behavior, according to all of the available studies (Table 9.7.1.7).

Table 9.7.1.7. Initiating unwelcomed/unwanted sexual behavior.

Nature of Any Difference					Postpubertal		
						Adult	
Males more						**NORTH AMERICA** *United States*: Lott et al. 1982; Baier et al. 1991 (college); P Anderson & Aymami 1993 (college)	
No signif. difference							
Females more							

9.7.1.8. Pushy/Assertive Sexual Overtures and Sexual Coercion

With the exception of one study of adolescents, all findings are consistent with the conclusion that males are more likely than females to make pushy and assertive sexual overtures toward others (usually to opposite sex peers) (Table 9.7.1.8).

Table 9.7.1.8. Pushy/assertive sexual overtures and sexual coercion.

Nature of Any Difference					Postpubertal		
					Adolescent	Adult	
Males more					**NORTH AMERICA** *Canada*: Poitras & Lavoie 1995	**NORTH AMERICA** *United States*: Sigelman et al. 1984:538 (college, dating couples); K Lane & Gwartney-Gibbs 1985 (college); P Burke et al. 1988 (college); Baier et al. 1991 (college); Sorenson & Siegel 1992; P Anderson & Aymami 1993 (college, using drugs or alcohol to initiate sex); Laumann et al. 1994:335; Hogben et al. 1996	
No signif. difference					**NORTH AMERICA** *United States*: Chadwick & Top 1993:62		
Females more							

9.7.1.9. Mounting and Genital Thrusting (Without Penetration)

Studies of non-human animals have all concluded that males are more likely than females to direct mounting and genital thrusting toward conspecifics (usually opposite sex peers) (Table 9.7.1.8).

Table 9.7.1.9. Mounting and genital thrusting (without penetration).

Nature of Any Dif-ference	Prepubertal				Postpubertal		Multiple Age Catagories
		Toddler		Childhood	Adolescent	Adult	
Males more		**PRIMATE (EXCEPT APE)** *Japanese Macaque*: GG Eaton et al. 1985:242*		**CANINE** *Dog*: FA Beach et al. 1968 **PRIMATE (EXCEPT APE)** *Japanese Macaque*: Eaton et al. 1985*	**PRIMATE (EXCEPT APE)** *Rhesus Macaque*: IS Bernstein et al. 1993:208 **UNGULATE** *Lamb*: Sachs & Harris 1978	**BIRD** *Zebra Finch*: Adkins-Regan et al. 1996	**PRIMATE (EXCEPT APE)** *Rhesus Macaque*: Michael & Saayman 1967
No signif. difference							
Females more							

9.7.1.10. Lordosis and Sexual Receptivity

Especially for rodents, lordosis is widely regarded as a sexually receptive posture. Therefore, it is somewhat surprising that only one study was specifically conducted to document that this posture is indeed exhibited more by females than by males (Table 9.7.1.10).

Table 9.7.1.10. Lordosis and sexual receptivity.

Nature of Any Difference							Multiple Age Categories
Males more							
No signif. difference							
Females more							**RODENT** *Rat*: Pfaff 1980

9.7.1.11. Orgasm

One study reached the conclusion that males are more likely than females to experience orgasm when engaged in sexual intercourse or masturbation (Table 9.7.1.11).

Table 9.7.1.11. Orgasm.

Nature of Any Difference						Postpubertal	
						Adult	
Males more						**NORTH AMERICA** *United States*: Kinsey et al. 1953:392 (during sexual intercourse & masturbation)	
No signif. difference							
Females more							

9.7.1.12. Sexual Vocalization

Some animals emit special calls that are indicative of a readiness to mate. At least among frogs, research has concluded that males are more likely than females to emit these vocalizations (Table 9.7.1.12).

Table 9.7.1.12. Sexual vocalization.

Nature of Any Difference							Multiple Age Categories
Males more							**AMPHIBIAN** *Frog*: R Schmidt 1976 (mate calling); Wetzel & Kelley 1983 (mate calling); Wetzel et al. 1985 (mate calling); D Kelley 1986 (mate calling)
No signif. difference							
Females more							

9.7.1.13. Premarital Sexual Intercourse

Among humans, information regarding sexual intercourse is derived from self-reports, and is therefore subject to being either exaggerated or understated. These possibilities are particularly salient to research on heterosexual sexual relationships because logically speaking, there can be no sex difference in the incidence of sexual intercourse between males and females. Nevertheless, as shown in Table 9.7.1.13, most studies throughout the world have found males reporting having had sexual intercourse with more opposite sex members than is true for females. Several studies have been undertaken to determine why such a gender difference would exist. One of the most elaborate and innovative involved the use of a research strategy, the so-called *bogus pipeline*, a method that leads subjects into believing that any deception on their part will be detected by a sophisticated type of "lie detector". This study revealed that males and females who were tested under bogus pipeline conditions reported almost identical numbers (~ 4) of premarital sex partners, whereas under standard test conditions (in which no efforts were taken to assure honesty), the number of sex partners reported by males was unchanged (~ 4), but those reported by females were substantially lower (~ 2). This suggests that in fact few if any gender differences in numbers of sex partners exist, but that females are less likely than males to fully report the number of sex partners they have had.

Table 9.7.1.13. Premarital sexual intercourse.

Nature of Any Difference	Postpubertal		Multiple Age Categories
	Adolescent	Adult	
Males more	**AFRICA** *Kenya*: Ajayi et al. 1991; *Nigeria*: Orubuloye et al. 1991 **ASIA** *Hong Kong*: Family Planning Association of Hong Kong 1994; *Korea*: Youn 1996 **EUROPE** *Britain*: Schofield 1965 (self-report); *Norway*: Traeen & Kvalem 1996*; *Scotland*: Wight et al. 2000 (young) **MIDDLE EAST** *Israel*: Harel & Kanny 1997 **NORTH AMERICA** *United States*: RC Sorensen 1973; Vener & Stewart 1974; Zelnik & Kantner 1980; Sonnenstein et al. 1991; EW Young et al. 1991:981* (Whites); RW Blum et al. 1992 (Native Americans); NM Morris 1992:174; Arnett & Jensen 1994:9*; Dolcini & Adler 1994:500; Alan Guttmacher Institute 1994; Paikoff et al. 2000 (young); Loewenson et al. 2004:210 (high school)	**ASIA** *China*: Chan 1990 (medical students); Pan 1993; Tang et al. 1997 (college) **EUROPE** *Germany*: Clement et al. 1984:112 (young); G Schmidt et al. 1994; *Norway*: Traeen & Kvalem 1996* **MIDDLE EAST** *Turkey*: Ulu & Ugurlu 1999 (college) **NORTH AMERICA** *United States*: Faulkner & De Jong 1966:41 (young); M Hunt 1974 (ages 18-24); Murstein & Holden 1979:625; Zelnik & Kantner 1980 (young); Blumstein & Schwartz 1983 (homosexuals); T Smith 1991; Weinberg et al. 1995:421* (college); DF Perkins et al. 1998 (college); NR Brown & Sinclair 1999 (males report more sex partners); A Walsh & Walsh 2002:214 (college); MG Alexander & Fisher 2003* (college, non-bogus pipeline testing conditions); PC Regan et al. 2004:671 (college)	**AFRICA** *Uganda*: Schopper et al. 1993; *Guinea*: Gorgen et al. 1998:66 **EUROPE** *Britain*: AM Johnson et al. 1990; *Norway*: Sundet et al. 1988; Sundet et al. 1989 **NORTH AMERICA** *Canada*: Ornstein 1989; *United States*: Terman 1938 (married couples); HJ Locke 1951 (married couples); Hunt 1973; DeLameter & MacCorquodale 1979:58*; Klassen et al. 1989; May et al. 1989; Laumann et al. 1994; Brewer et al. 2000 **INTERNATIONAL** *Multiple Countries*: TW Smith 1992 (4 countries)
No signif. difference	**ASIA** *China*: WCW Wong et al. 2004 **EUROPE** *Denmark*: Arnett & Jensen 1994:9* **NORTH AMERICA** *United States*: PY Miller & Simon 1974 (17 year olds); DS Moore & Erickson 1985; Brooks-Gunn & Furstenberg 1989; EW Young et al. 1991:981* (Blacks)	**EUROPE** *Sweden*: Weinberg et al. 1995:421* (oral sex) **NORTH AMERICA** *Canada*: Meston et al. 1996 (young); Maticka-Tyndale et al. 1998 (college, spring breakers); *United States*: Bauman & Wilson 1974 (college); Jessor & Jessor 1974 (college); DeLamater & MacCorquodale 1979* (oral sex); ES Person et al. 1989 (young); Lottes 1993 (oral sex); Hsu et al. 1994:107 (young); Weinberg et al. 1995:421* (oral sex); MG Alexander & Fisher 2003* (college, bogus pipeline testing conditions)	**EUROPE** *Sweden*: Haggstrom-Nordin et al. 2002:291 (Sweden, adol)
Females more	**AFRICA** *Liberia*: D Nichols et al. 1987:173 **EUROPE** *Germany*: Schlaegel et al. 1975 (self-report) **NORTH AMERICA** *United States*: Jessor & Jessor 1975 (10th graders); DM Siegel et al. 1998 (more consistent in reports); Upchurch et al. 2002 (more consistent in reports)	**EUROPE** *Sweden*: Weinberg et al. 1995:421* (college)	

9.7.1.14. Age of First Sexual Intercourse

Numerous studies have asked subjects at what age did they first experience sexual intercourse. As shown in Split-Table 9.7.1.14a, the findings have been quite mixed, with most studies of adolescent subjects indicating girls had sex at a younger average age than boys.

Split-Table 9.7.1.14a. Age of first sexual intercourse (adolescents).

Nature of Any Difference	Postpubertal
	Adolescent
Younger for males	**EUROPE** *Sweden*: H Zetterberg 1969* **NORTH AMERICA** *United States*: Lewis 1973; Verner & Stewart 1974; Mott & Haurin 1988; Brooks-Gunn & Furstenberg 1989; De Gaston et al. 1996
No signif. difference	**EUROPE** *Norway*: Engen & Walloe 1978*
Younger for females	**EUROPE** *Finland*: Kosunen et al. 1998; Kaltiala-Heino et al. 2003:537; *Norway*: Engen & Walloe 1978* (college); EF Jones et al. 1985; BO Eriksen et al. 1988; Pedersen 1988; Kraft et al. 1990; JM Sundet et al. 1990; P Kraft 1991:208; Sundet et al. 1992:247; *Sweden*: H Zetterberg 1969*; B Lewin 1982 **NORTH AMERICA** *United States*: Christensen & Gregg 1970; Schmidt & Sigusch 1972

However, the findings for adults have generally suggested the opposite pattern: Males report having had their first sexual experience at a younger average age than is true for females (Split-Table 9.7.1.14b). Also investigated in three studies was the average age of first sexual intercourse among birds. One of these studies found no significant sex difference, while the other two concluded that females were younger than males of their species at their first sexual experience.

Split-Table 9.7.1.14b. Age of first sexual intercourse (adults).

Nature of Any Difference	Postpubertal	Multiple Age Categories
	Adult	
Younger for males	**AFRICA** *Guinea*: Gorgen et al. 1998 (young) **ASIA** *China*: Tang et al. 1997 (college); *Japan*: Asayama 1975 (college); *Thailand*: Carael 1995* (young) **EUROPE** *Europe*: Bozon & Kontula 1998* (young) **LATIN AMERICA** Brazil: Carael 1995* (young, Rio de Janeiro) **NORTH AMERICA** *United States*: WC Wilson 1975; DeLamater & MacCorquodale 1979; Phillips & Gromko 1985; Earle & Perricone 1986 (college); Darling & Davidson 1987 (college); Reiss 1990 **OCEANIA** *New Zealand*: Gavey 1991 (college); *Philippines*: Carael 1995* (young, Manila) **INTERNATIONAL** *Multiple Countries*: McCauley & Salter 1995 (young); Wellings & Mitchell 1998:83	
No signif. difference	**EUROPE** *Britain*: LT Higgins et al. 2002:87 (college); *Sweden*: Weinberg et al. 1995* (college) **NORTH AMERICA** *United States*: Reinisch et al. 1992 (college); Lottes 1993 (college); Weinberg et al. 1995:421* (college)	**EUROPE** *Britain*: M Johnson et al. 1994; Wellings & Field 1996; *Sweden*: Kosunen et al. 1993; Edgardh et al. 1999 **BIRD** *Cassin's Auklet*: Pyle 2001
Younger for females	**EUROPE** *Germany*: Clement et al. 1984; *Norway*: Noack & Ostby 1981 (young); Sundet et al. 1992*	**BIRD** *Adelie Penguin*: Ainley et al. 1983; *Thick-Billed Murre*: Gaston et al. 1994

9.7.1.15. Number of Sex Partners

The only way to obtain a reasonable estimate of the number of sex partners people have had is to ask them (Shrier et al. 1996:378). To assess the accuracy of these self-reports, a few studies have surveyed the same people two or more times. These studies have revealed that there is a general tendency to under-report the number of partners one has had, especially by females (Gold 1970), but that there is a tendency for at least a small proportion of males to exaggerate (Clark & Tifft 1966). Nonetheless, the answers given by most subjects appear to be accurate (Rodgers et al. 1982; Kahn et al. 1988). Obviously, the number of heterosexual partners each sex has had should be equal (Phillis & Gromko 1985).

Table 9.7.1.15 summarizes the findings of research on self-reported number of sex partners and gender. It shows that in nearly all countries males report having had more sex partners than is true for females. As noted above, this difference could be at least partly the result of exaggerating by males and/or under-reporting by females. On the other hand, it is worth bearing in mind that most of the studies have been conducted among college students, and it may be the case that this tends to exclude a sizable proportion of poorly educated females who are unusually sexually active. In this regard, one study suggested that the failure of most other studies to include prostitutes in their sample was responsible for the apparent disparity in the number of sex partners each gender has had.

Table 9.7.1.15. Number of sex partners.

Nature of Any Difference	Postpubertal		Multiple Age Categories
	Adolescent	Adult	
Males report more	**AFRICA** *Nigeria*: Orubuloye et al. 1991 **ASIA** *Korea*: Youn 1996 **NORTH AMERICA** *United States*: Luster & Small 1994	**AFRICA** *Ghana & Nigeria*: Gage & Meekers 1994:58; *Guinea*: Gorgen et al. 1998:66 **EUROPE** *Britain*: AM Johnson et al. 1992; *France*: Quenel et al. 1991; Messiah et al. 1996:242; *Germany*: Clement et al. 1984:112* (college, in 1966); *Sweden*: TW Smith 1992* **LATIN AMERICA** *Barbados*: Handwerker 1993:312 (college) **MIDDLE EAST** *Israel*: Al-Krenawi et al. 1997 (practice polygamy, among Arab population) **NORTH AMERICA** *Canada*: JJ Levy et al. 1988; *United States*: Carroll et al. 1985; Earle & Perricone 1986 (college); McDonald et al. 1990 (college); TW Smith 1991*; Reinisch et al. 1992 (college); Lottes 1993 (college); Walsh 1993 (college); Wiederman 1997; Chivers & Bailey 2005:116; WD Mosher et al. 2005:13 (lifetime) **OCEANIA** *New Zealand*: Paul et al. 1995	**AFRICA** *Uganda*: Schopper et al. 1993 **EUROPE** *Britain*: M Morris 1993; Wellings et al. 1994; *Denmark*: Melbye & Biggar 1992; *France*: ACSF 1992; *Norway*: Sundet et al. 1989; *Multiple Countries*: TW Smith 1992*; Leridon et al. 1998:180; *Sweden*: Herlitz & Ramstedt 2005 (16-44 yr olds) **NORTH AMERICA** *United States*: Kinsey et al. 1953; TW Smith 1991*; TW Smith 1992*; Dolcini et al. 1993; Laumann et al. 1994:184; Tourangeau et al. 1997:217 (bogus pipeline method) **OCEANIA** *New Zealand*: PB Davis et al. 1993
No signif. difference		**NORTH AMERICA** *United States*: DD Brewer et al. 2000 (including prostitutes)	
Females report more		**EUROPE** *Sweden*: Clement et al. 1984:112* (college) **BIRD** *Black Coucal*: Vernon 1971; Slotow 1996; Goymann et al. 2004b **INSECT** *Hover Wasp*: Turillazzi 1989; *Paper Wasp*: JM Carpenter 1991; *Polistine Wasp*: Sinha et al. 1993	

9.7.1.16. Premarital Pregnancy

One study concluded that among unmarried persons, females reported having experienced (or caused) an out-of-wedlock pregnancy more often than was true for males (Table 9.7.1.16). This difference is probably due to the fact that females would be more likely than males to be aware of such an outcome.

Table 9.7.1.16. Premarital pregnancy.

Nature of Any Difference							Multiple Age Categories
Males more							
No signif. difference							
Females more							**AFRICA** *Guinea*: Gorgen et al. 1998:67

9.7.1.17. Bonding Partners, Number of

Many species tend to form at least temporary bonding relationship with their sex partners. Two studies of ground squirrels concluded that males averaged more bonding partners than did females (Table 9.7.1.17).

Table 9.7.1.17. Bonding partners, number of.

Nature of Any Difference					Postpubertal		Multiple Age Categories
						Adult	
Males more						**RODENT** *Ground Squirrel*: FC Evans & Holdenried 1943	**RODENT** *Ground Squirrel*: Owings et al. 1977
No signif. difference							
Females more							

9.7.1.18. Being in Love With a Sex Partner

A survey of males and females in Europe concluded that among non-virgins, females were more likely than males to report having been in love with their first sex partner (Table 9.7.1.18).

Table 9.7.1.18. Being in love with a sex partner.

Nature of Any Difference							Multiple Age Categories
Males more							
No signif. difference							
Females more							**EUROPE** *Several European Countries*: Bozon & Kontula 1998:53* (first sex partner) **NORTH AMERICA** *United States*: Balswick & Avertt 1977 (among dating couples); Dosser et al. 1983

9.7.1.19. Extramarital Sexual Relationships/Affairs

According to several studies based on self-reports, males report having extramarital sexual relationships more than do females (Table 9.7.1.19). However, in one study of convictions for this behavior in 17th century Sweden (when it was a criminal offense), females were convicted more often than males.

Table 9.7.1.19. Extramarital sexual relationships/affairs.

Nature of Any Difference					Postpubertal		Multiple Age Categories
						Adult	
Males more						**NORTH AMERICA** *United States*: Blumstein & Schwartz 1983; Spanier & Margolis 1983; A Lawson 1988; A Greeley 1994; Laumann et al. 1994; Wiederman 1997; DC Atkins et al. 2001	**NORTH AMERICA** *United States*: GL Hansen 1987 (among steady dating couples)
No signif. difference							
Females more						**EUROPE** *Sweden*: Sundin 1992 (17th century, convicted for extramarital sex)	

9.7.1.20. Active in Forming Harems

Two studies of involvement in forming harems among baboons both concluded that males were more actively involved in doing so than were females (Table 9.7.1.20).

Table 9.7.1.20. Active in forming harems.

Nature of Any Difference					Postpubertal	
					Adolescent	Adult
Males more					**PRIMATE (EXCEPT APE)** *Baboon*: Rowell 1972:53	**PRIMATE (EXCEPT APE)** *Baboon*: Kummer & Kurt 1967
No signif. difference						
Females more						

9.7.1.21. Sexual Experience with Same Sex (Homosexual Behavior)

According to most studies, more males than females report having had at least one sexual experience with a member of their own sex (Table 9.7.1.21).

Table 9.7.1.21. Sexual experience with same sex (homosexual behavior).

Nature of Any Difference					Postpubertal		Multiple Age Categories
					Adolescent	Adult	
Males more					**NORTH AMERICA** *United States*: RC Sorenson 1973; Remafedi et al. 1992:719*; R Garofalo et al. 1999:489	**EUROPE** *Britain*: Sell et al. 1995* (past 5 years); *France*: Sell et al. 1995* (past 5 years) **NORTH AMERICA** *United States*: Athanasiou et al. 1970 (young); Sell et al. 1995* (past 5 years); L Ellis et al. 2005:571; WD Mosher et al. 2005:15	**EUROPE** *Britain*: Wellings et al. 1994:187; *France*: Spira et al. 1993:138 **NORTH AMERICA** *United States*: McKirnan & Peterson 1989a:547; Laumann et al. 1994:295, 312
No signif. difference							**NORTH AMERICA** *United States*: Strakosch 1934; C Landis & Bolles 1942; MW Brody 1943
Females more					**ASIA** *Hong Kong*: ST Cheng & Chan 1999 **NORTH AMERICA** *United States*: Remafedi et al. 1992:718* (occasional)		

9.7.2. Marital Behavior

Research findings pertaining to behavior having to do with being or having been married are reviewed below.

9.7.2.1. Being or Having Been Married

Several studies have compared males and females regarding whether or not they were or at least had ever been married. As shown in Table 9.7.2.1, most of these studies have found males are married more often than females.

Table 9.7.2.1. Being or having been married.

Nature of Any Difference					Postpubertal		Multiple Age Categories
						Adult	
Males more						**EUROPE** *Britain*: N Nicholson & West 1988 (managers); *Germany*: J Smith & Baltes 1998 (elderly) **NORTH AMERICA** *Canada*: Houseknecht et al. 1987 (professional occupations); Greenglass 1988 (managers); Greenglass & Burke 1988 (managers); N Nicholson & West 1988 (managers); Greenglass 1990 (managers); Greenglass 1993 (managers); *United States*: Lauriat 1959:173; Long & Fox 1995:56 (scientists); Soldo et al. 1997 (elderly); TJ Hoff 2004:306 (physicians)	
No signif. difference							
Females more						**ASIA** *China*: Anson & Sun 2002:1048 (elderly)	**ASIA** *China*: Bullough & Ruan 1994:387

9.7.2.2. Having More Than One Spouse/Mate (Polygamy)

In a few species of birds, males have been shown to be polygamous to a greater degree than females (Table 9.7.2.2).

Table 9.7.2.2. Having more than one spouse/mate (polygamy)

Nature of Any Difference					Postpubertal		
						Adult	
Males more						**BIRD** *Great Reed Warbler*: Nishiumi et al. 1996; *Red-winged Blackbird*: Weatherhead & Robertson 1979; *Yellow-headed Blackbird*: CB Patterson et al. 1980	
No signif. difference							
Females more							

9.7.2.3. Relative Age of Married or Dating Couples

Many studies have sought to determine the relative age of couples when marrying. Some studies have involved consulting records maintained by courthouses or churches while other studies have relied on self-reports of one or both couples. Table 9.7.2.3 shows that with only a few exceptions, males throughout the world tend to be older than the females when they marry.

Table 9.7.2.3. Relative age of married or dating couples.

Nature of Any Difference	Postpubertal		Multiple Age Categories
	Adolescent	Adult	
Males older than females	**AFRICA** *Nigeria*: R Cohen 1967 (Bornu) **NORTH AMERICA** *United States*: de Lissovoy & Hitchcock 1964; de Lissovoy & Hitchcock 1965	**AFRICA** *Nigeria*: SR Barrett 1982:22 **ASIA** *Bangladesh*: Ruback et al. 2002:109*; *Hong Kong*: Salaff 1976:398; *India*: Jayaraj & Subramanian 2004:108; *Japan*: WM Caudill 1969:195 **EUROPE** *Spain*: Gil-Burmann et al. 2002:506; *Sweden*: Dahlstrom & Liljestrom 1967:25 **LATIN AMERICA** *Brazil*: Otta et al. 1999* **MIDDLE EAST** *Pakistan*: Ruback et al. 2002:110* **NORTH AMERICA** *United States*: US Bureau of the Census 1980 (older median age at marriage); PF Secord 1983; O'Kelly & Carney 1986:29 (foraging societies); US Bureau of the Census 1986:80; Crapo 1990:338; Nielsen 1990:113; Kenrick & Keefe 1992*; TJ Crow 1998:1094* (internet survey); US Bureau of the Census 1995 **OCEANIA** *Philippines*: Kenrick & Keefe 1992* (young) **INTERNATIONAL** *Multiple Preliterate Societies*: Whyte 1975:223* (61 out of 70 societies); *Multiple Countries*: TJ Crow 1998:1094* (young)	**AFRICA** *Guinea*: Keita 1992; *Kenya*: Whiting 1993:438; *Morocco*: A Walter 1997; *Several African Countries*: J Goody 1973:184 **EUROPE** *Britain*: S Scott & Duncan 1999 (1600-1800); Bozon 1991; *Ireland*: JP Kent 2002:529 **LATIN AMERICA** *Brazil*: Otta et al. 1999* **NORTH AMERICA** *Canada*: Buckle et al. 1996:365; *United States*: TP Monahan & Chancellor 1955:165; Burchinal 1965; JT Landis 1965; JJ Moss 1965; R Parke & Glick 1967; Bayer 1968; Marini 1978b:495; National Center for Health Statistics 1991:Table 1.10; Kenrick & Keefe 1992*; Darroch et al. 1999 (dating couples) **OCEANIA** *New Zealand*: TE Moffit et al. 2001:20 **INTERNATIONAL** *Multiple Countries*: Bankole & Singh 1998 (18 out of 18 countries); S Singh et al. 2000:24 (14 out of 14 countries)
No signif. difference		**INTERNATIONAL** *Multiple Preliterate Societies*: Whyte 1978:223* (7 out of 70 societies)	
Females older than males		**INTERNATIONAL** *Multiple Preliterate Societies*: Whyte 1978:223* (2 out of 70 societies)	

9.7.2.4. Effort Made to Maintain a Marriage

When divorce is possible, one spouse may make a greater effort to maintain the marriage than the other. According to the studies cited in Table 9.7.2.4, wives are more likely to do so than husbands.

Table 9.7.2.4. Effort made to maintain a marriage.

Nature of Any Difference							Multiple Age Categories
Males more							
No signif. difference							
Females more							**NORTH AMERICA** *United States*: Canary & Stafford 1992; Ragsdale 1996; Stafford et al. 2000; Canary et al. 2002

9.7.2.5. Offering Financial Stability or Wealth to Prospective Mates

The available studies regarding which sex is most likely to offer financial stability to prospective mates (usually in personal ads) have concluded that doing so is more common among males than females (Table 9.7.2.5).

Table 9.7.2.5. Offering financial stability or wealth to prospective mates.

Nature of Any Difference					Postpubertal		Multiple Age Categories
						Adult	
Males more						**NORTH AMERICA** *United States*: C Cameron et al. 1977 (personal ads); AA Harrison & Saeed 1977 (personal ads)	**EUROPE** *Spain*: Burmann et al. 2002 **NORTH AMERICA** *United States*: Deaux & Hanna 1984 (personal ads)
No signif. difference							
Females more							

9.7.2.6. Hypergamy

The tendency to marry someone who is of higher social status than oneself is known as *hypergamy*. It is usually assessed by comparing the income, education, or occupational level of the parents of the brides and grooms. As noted in Table 9.7.2.6, whenever significant differences have been found, men are of higher status than the women they marry.

Table 9.7.2.6. Hypergamy.

Nature of Any Difference							Multiple Age Categories
Males higher							**NORTH AMERICA** *United States*: TC Hunt 1940; Centers 1949; Elder 1969; JW Hudson & Henze 1969; Taylor & Glenn 1976; Glenn & Taylor 1984
No signif. difference							**NORTH AMERICA** *United States*: Hollingshead 1950; Rubin 1968
Females higher							

9.7.2.7. Divorce Initiation

When couples divorce, court documents usually provide information regarding which party initiated the divorce. Several studies have analyzed these documents in order to determine whether husbands or wives are most likely to initiate a divorce. Table 9.7.2.7 indicates that, with the possible exception of divorce among middle-aged and elderly persons, females are more likely than males to file for divorce.

Table 9.7.2.7. Divorce initiation.

Nature of Any Difference					Postpubertal		Multiple Age Categories
						Adult	
Males more						**ASIA** *China*: Bullough & Ruan 1994:389* (over age 50)	
No signif. difference						**EUROPE** *Britain*: Buckle et al. 1996:365* (elderly)	
Females more						**ASIA** *China*: Bullough & Ruan 1994:389* (young) **EUROPE** *Britain*: Buckle et al. 1996:365* **NORTH AMERICA** *United States*: WG Beach & Ogburn 1925:195; CT Hill et al. 1976 (young); RB Dixon & Weitzman 1982; Pettit & Bloom 1984; LE Black et al. 1991; Rubin et al. 1981 (among dating couples); Gander 1992:54	**EUROPE** *Germany*: Mohrmann 1992 **NORTH AMERICA** *United States*: TP Monahan & Chancellor 1955:169; Goode 1956; US Department of Health, Education, and Welfare 1973; P Brown 1976; Kitson 1992

9.7.2.8. Adultery as the Reason for Initiating Divorce Proceedings

The one available study on adultery as the reason given for seeking a divorce concluded that this was more often a reason given by husbands than by wives (Table 9.7.2.8).

Table 9.7.2.8. Adultery as the reason for initiating divorce proceedings.

Nature of Any Difference						Postpubertal
						Adult
Males more likely						**EUROPE** *Britain*: Buckle et al. 1996
No signif. difference						
Females more likely						

9.7.2.9. Cruelty as the Reason for Initiating Divorce Proceedings

According to one study, wives were more likely than husbands to cite cruelty as the reason they were seeking a divorce (Table 9.7.2.9).

Table 9.7.2.9. Cruelty as the reason for initiating divorce proceedings.

Nature of Any Difference						Postpubertal
						Adult
Males more likely						
No signif. difference						
Females more likely						**EUROPE** *Britain*: Buckle et al. 1996

9.7.2.10. Remarriage Following Divorce/Widowhood

A limited number of studies have concluded that males are more likely than females to remarry following a divorce (Table 9.7.2.10).

Table 9.7.2.10. Remarriage following divorce/widowhood.

Nature of Any Difference						Postpubertal	Multiple Age Categories
						Adult	
Males more likely						**NORTH AMERICA** *United States*: PH Jacobson 1959:69; Ross & Sawhill 1975; Glick 1980; KR Smith et al. 1991 (elderly widowers)	**EUROPE** *Multiple European Countries*: Seccombe 1992:245 (16th-19th Century)
No signif. difference							
Females more likely							

9.7.2.11. Economic Consequences of Divorce

Most of the available evidence indicates that following a divorce, males fare better financially than do females (Table 9.7.2.11).

Table 9.7.2.11. Economic consequences of divorce.

Nature of Any Difference						Postpubertal	Multiple Age Categories
						Adult	
Males better off							**NORTH AMERICA** *United States*: H Carter & Glick 1970; R Hampton 1975; Ross & Sawhill 1975; GJ Duncan & Hoffman 1985; LJ Weitzman 1985; GJ Duncan & Hoffman 1988
No signif. difference							
Females better off						**EUROPE** *Netherlands*: Poortman 2000	

Chapter 10

CONSUMING AND INDIVIDUAL-INSTITUTIONAL INTERACTIONS

This chapter contains information surrounding sex differences in two fairly distinct types of behavior. One type involves consumption not only of food and drugs, but also of non-eatable goods and services. The other type of behavior addressed in this chapter has to do with how individuals interact with various social institutions. The institutions primarily include those of religion and the criminal justice system.

10.1

ACQUIRING AND CONSUMING ACTIVITIES

The acquisition and consumption of goods and services is a prominent aspect of human behavior. Studies of sex differences in such behavior are reported below.

10.1.1. Shopping and Purchasing Behavior

A limited number of studies have compared males and females regarding their tendencies to shop in different ways and to purchase different types of goods and services.

10.1.1.1. Shopping in General

As indicated in Table 10.1.1.1, shopping is an activity to which females devote greater time than is true for males. The one apparent exception to this generalization involves shopping on the internet, as discussed in the subsequent table.

Table 10.1.1.1. Shopping in general.

Nature of Any Difference					Postpubertal		Multiple Age Categories
					Adolescent	Adult	
Males more							
No signif. difference							
Females more					**NORTH AMERICA** *United States*: Cogle & Tasker 1982; Mauldin & Meeks 1990	**EUROPE** *Britain*: Dittmar et al. 2004 (conventional shops) **NORTH AMERICA** *United States*: Putnam & Davidson 1987	**EUROPE** *Germany*: Scherhorn et al. 1990 **NORTH AMERICA** *United States*: O'Guinn & Faber 1989; Montello et al. 1999

10.1.1.2. Shopping Electronically

The one type of shopping that males engage in more than do females is shopping electronically, i.e., on the internet (Table 10.1.1.2).

Table 10.1.1.2. Shopping electronically.

Nature of Any Difference	Postpubertal	Multiple Age Categories
	Adult	
Males more	**EUROPE** *Britain*: Dittmar et al. 2004 **NORTH AMERICA** *United States*: S Rodgers & Sheldon 1999; S Rodgers & Harris 2003:326 **INTERNATIONAL** *No Specific Country*: Kwak et al. 2002	**INTERNATIONAL** *Multiple Countries*: Briones 1998; Bartel-Sheehan 1999
No signif. difference	**ASIA** *Singapore*: Teo & Lim 2000	
Females more		

10.1.1.3. Purchasing Goods and Services Other Than Clothing

As shown in Table 10.1.1.3, the available research indicates that females make more purchases of food and other household commodities than do males. One estimate was that 87% of these types of purchases were made by women (Yankelvich 1993).

Table 10.1.1.3. Purchasing goods and services other than clothing.

Nature of Any Difference	Postpubertal	
	Adolescent	Adult
Males more		
No signif. difference		
Females more	**NORTH AMERICA** *United States*: FJ Chaloupka 1999 (tobacco products)	**NORTH AMERICA** *United States*: KE Walker & Woods 1976; Yankelvich 1993

10.1.1.4. Spending Money on Illegal Drugs

The one available study of illegal drug purchasing concluded that this was more common among males than among females (Table 10.1.1.4).

Table 10.1.1.4. Spending money on drugs.

Nature of Any Difference	Postpubertal
	Adult
Males more	**NORTH AMERICA** *United States*: CJ Wong et al. 2002 (among cocaine addicts)
No signif. difference	
Females more	

10.1.1.5. Price Elasticity

Price elasticity refers to the range in prices that can be set without significantly affecting the purchasing decision of customers. As shown in Table 10.1.1.5, at least in the case of cigarettes, females exhibit greater price elasticity than do males. In other words, males would stop or curtail their purchases of cigarettes sooner as cigarette prices increased than would females.

Table 10.1.1.5. Price elasticity.

Nature of Any Difference	Postpubertal
	Adult
Males more	
No signif. difference	
Females more	**NORTH AMERICA** *United States*: Farrelly et al. 2001 (for cigarettes among smokers)

10.1.1.6. Price Consciousness

One study found females on average to be more price conscious than was the case for males (Table 10.1.1.6).

Table 10.1.1.6. Price consciousness.

Nature of Any Difference	Postpubertal
	Adult
Males more	
No signif. difference	
Females more	**NORTH AMERICA** *United States*: E Sherman et al. 2001 (elderly, retail merchandise)

10.1.1.7. Factors Considered Before Making Purchases

Table 10.1.1.7 indicates that females weigh more factors than males do before they make a purchase.

Table 10.1.1.7. Factors considered before making purchases.

Nature of Any Difference	Postpubertal
	Adult
Males more	
No signif. difference	
Females more	**NORTH AMERICA** *United States*: Meyers-Levy & Maheswaran 1991; Meyers-Levy & Sternthal 1991

10.1.2. Ingesting Behavior (Other Than Drug Ingesting)

Studies of sex differences in the ingestion of various substances other than drugs are reviewed in the following section.

10.1.2.1. Food Consumption/Intake

Studies undertaken to determine which sex consumes more have involved humans as well as other species. Given that in most species, males are larger than females, noting that males usually consume more than do females is not particularly surprising (Table 10.1.2.1).

Table 10.1.2.1. Food consumption/intake.

Nature of Any Difference	Prepubertal			Multiple Age Categories
	Early Childhood	Childhood	Adult	
Males more	**EUROPE** *Britain*: Sahota et al. 2001 (bread & snack foods) **UNGULATE** *Deer*: Nordan et al. 1970; Robbins & Moen 1975	**LATIN AMERICA** *Chile*: Olivares et al. 2004:1281 (bread & snack foods) **NORTH AMERICA** *United States*: Zelig 1962 (milk)	**ASIA** *Bangladesh*: Pitt et al. 1990 (calories) **RODENT** *Rat*: GH Wang 1924; Leshner & Collier 1973 (young, proportion of protein)	**NORTH AMERICA** *United States*: LJ Roberts 1944; Frazao & Cleveland 1994 (fat & cholesterol)
No signif. difference				
Females more			**RODENT** *Hamster*: K Kowalewski 1969	

10.1.2.2. Time Spent Eating/Grazing in General

Depending on the species involved, studies of ungulates (hoofed animals) have reached different conclusions regarding possible sex differences in the amount of time spent grazing (Table 10.1.2.2).

Table 10.1.2.2. Time spent eating/grazing in general.

Nature of Any Difference	Adult
Males more	**UNGULATES** *Red Deer*: Clutton-Brock et al. 1982
No signif. difference	**UNGULATES** *Black Tailed Deer*: Weckerly 1993
Females more	**UNGULATES** *Chamois*: Perez-Barberia et al. 1997; *Giraffe*: Leuthold & Leuthold 1978; Pellew 1984; Ginnett & Demment 1997; *Waterbuck*: Spinage 1968

10.1.2.3. Time Spent Grazing in High-Quality Areas

Several studies of time spent grazing by various ungulate species have pertained to areas where food was relatively abundant. As with time spent grazing in general, these studies have reached conflicting conclusions although most studies indicate that females spend more time than males grazing (Table 10.1.2.3).

Table 10.1.2.3. Time spent grazing in high-quality areas.

Nature of Any Difference	Postpubertal
	Adult
Males more	**UNGULATES** *Bighorn Sheep*: Shank 1982 (winter); *Soay Sheep*: Perez-Barberia & Gordon 1999:264
No signif. difference	
Females more	**UNGULATES** *Bighorn Sheep*: Geist & Petocz 1977; *Chamois*: Perez-Barberia et al. 1997; *Mule Deer*: Bowyer 1984; *Red Deer*: WN Charles et al. 1977; A Watson & Staines 1978 (winter); Staines et al. 1982 (winter); *White-Tailed Deer*: Beier 1987

10.1.2.4. Daily Water Consumption

Research undertaken to determine if males or females consume greater amounts of water have been confined to rats. These studies have reached inconsistent conclusions regarding any possible gender differences (Table 10.1.2.4).

Table 10.1.2.4. Daily water consumption.

Nature of Any Difference	Postpubertal	Multiple Age Categories
	Adult	
More among males	**RODENT** *Rat*: Valenstein et al. 1967 (young); Krecek 1973 (young)	
No signif. difference		
More among females		**RODENT** *Rat*: Dow-Edwards et al. 1989; McGivern & Henschel 1990; McGivern et al. 1996; McGivern et al. 1998

10.1.2.5. Eating Fruit

Studies of various species of primates have all concluded that greater proportions of fruit were in the diets of females than was true for males (Table 10.1.2.5).

Table 10.1.2.5. Eating Fruit.

Nature of Any Difference	Postpubertal
	Adult
More among males	
No signif. difference	
More among females	**PRIMATE (EXCEPT APE)** *Brown Capuchin Monkey*: J Terborgh 1983; *Tufted Capuchin Monkey*: I Agostini & Visalberghi 2005; *Wedge-Capped Capuchin Monkey*: DM Fragaszy 1986; JG Robinson 1986; DM Fragaszy & Boinski 1995; *White-faced Capuchin Monkey*: LM Rose 1994; KC Mackinnon 1995

10.1.2.6. Eating Insects

Studies of insect eating among chimpanzees concluded that females devoted more time to this activity than males (Table 10.1.2.6).

Table 10.1.2.6. Eating insects.

Nature of Any Difference	Postpubertal	Multiple Age Categories
	Adult	
More among males		
No signif. difference		
More among females	**APE** *Chimpanzee*: McGrew 1979	**APE** *Chimpanzee*: Uehara 1986; Lonsdorf 2005

10.1.2.7. Eating Meat

The proportion of an individual's diet involving meat has been compared for several species of monkeys, all of which concluded that the proportions were higher for males than for females (Table 10.1.2.7).

Table 10.1.2.7. Eating meat.

Nature of Any Difference					Postpubertal	
					Adolescent	Adult
More among males					**PRIMATE (EXCEPT APE)** *Tufted Capuchin Monkey*: I Agostini & Visalberghi 2005	**PRIMATE (EXCEPT APE)** *Brown Capuchin Monkey*: J Terborgh 1983; *Wedge-Capped Capuchin Monkey*: DM Fragaszy 1986; JG Robinson 1986; DM Fragaszy & Boinski 1995; *White-Faced Capuchin Monkey*: LM Rose 1994; KC Mackinnon 1995
No signif. difference						
More among females						

10.1.2.8. Fat Consumption

A study of fat consumption suggested that it was greater for males than for females (Table 10.1.2.8).

Table 10.1.2.8. Fat consumption.

Nature of Any Difference							Multiple Age Categories
More among males							**NORTH AMERICA** *United States*: Polednak 1997a (among Hispanics)
No signif. difference							
More among females							

10.1.2.9. Saccharin Consumption

Sex differences in the consumption of saccharin (an artificial sweetener) have been reported in a few rodent species. As shown in Table 10.1.2.9, these studies have concluded that such consumption is more common in females than in males.

Table 10.1.2.9. Saccharin consumption.

Nature of Any Difference					Postpubertal	
						Adult
More among males						
No signif. difference						
More among females						**RODENT** *Hamster*: I Zucker et al. 1972; *Rat*: Valenstein et al. 1967b; RF McGivern et al. 1984a; S Baron et al. 1995

10.1.2.10. Salt Consumption

Research concerning gender differences in salt consumption has been confined to rats, and it has unanimously concluded that females consume more than do males (Table 10.1.2.10).

Table 10.1.2.10. Salt consumption.

Nature of Any Difference					Postpubertal	
						Adult
More among males						
No signif. difference						
More among females						**RODENT** *Rat*: Valenstein et al. 1967 (young); Krecek et al. 1972 (young); Krecek 1973 (young); Sakai et al. 1989; Frankmann et al. 1991; SY Chow et al. 1992; FW Flynn et al. 1993; KS Curtis & Contreras 2003; Leshem et al. 2004

10.1.3. Ingesting/Utilizing Medications, Nutrients, and Cosmetics

Among humans, the consumption of various health and beauty products has become common. Studies of sex differences in this regard are presented below.

10.1.3.1. Utilizing Cosmetics

According to two studies, females are more inclined to utilize cosmetics than are males (Table 10.1.3.1).

Table 10.1.3.1. Utilizing cosmetics.

Nature of Any Difference					Postpubertal
					Adult
Males more					
No signif. difference					
Females more					**INTERNATIONAL** *Multiple Countries*: Corson 1972; Gunn 1973

10.1.3.2. Ingesting Medications (Legal Drugs) in General

Setting aside illegal and/or recreational drugs, quite a number of studies have revealed that females take more medications than do males (Table 10.1.3.2).

Table 10.1.3.2. Ingesting medications (legal drugs) in general.

Nature of Any Difference	Prepubertal			Postpubertal		Multiple Age Categories
			Childhood	Adolescent	Adult	
Males more						
No signif. difference			**NORTH AMERICA** *United States*: Rabin & Bush 1975*			
Females more				**NORTH AMERICA** *United States*: Rabin & Bush 1975*	**NORTH AMERICA** *United States*: Abelson et al. 1973; Choi 1973; H Parry et al. 1973; Rabin & Bush 1975* (young, middle age & elderly); P Bush & Rabin 1976; Rabin & Bush 1976; Suffet & Brotman 1976; PJ Bush & Rabin 1977 (excluding oral contraceptives); Rabin 1977; P Bush & Osterweis 1978	**NORTH AMERICA** *United States*: Mellinger et al. 1974; Warheit et al. 1976; Choi 1977; Nathanson 1977a; Glickman 1978; Koch & McLemore 1978; C Wilder 1978; Verbrugge 1982b

10.1.3.3. Consuming Nonprescription (Over-the-Counter) Drugs

Nearly all studies of the consumption of over-the-counter medications have concluded that females consume to a greater extent than males (Table 10.1.3.3).

Table 10.1.3.3. Consuming nonprescription (over-the-counter) drugs.

Nature of Any Difference	Prepubertal				Postpubertal		Multiple Age Categories
	Infant	Toddler	Early Childhood	Childhood	Adolescent	Adult	
Males more							
No signif. difference			**NORTH AMERICA** *United States*: PJ Bush & Rabin 1976*				
Females more	**NORTH AMERICA** *United States*: PJ Bush & Rabin 1976*	**NORTH AMERICA** *United States*: PJ Bush & Rabin 1976*		**NORTH AMERICA** *United States*: PJ Bush & Rabin 1976*	**NORTH AMERICA** *United States*: PJ Bush & Rabin 1976*	**EUROPE** *Netherlands*: Gijsbers van Wijk 1991* **NORTH AMERICA** *United States*: PJ Bush & Rabin 1976*; PJ Bush & Rabin 1977 (excluding oral contraceptives); PJ Bush & Osterweis 1978	**NORTH AMERICA** *United States*: Knapp & Knapp 1972; PJ Bush & Rabin 1976*

10.1.3.4. Consuming Nutrients and Vitamins

The available studies on sex differences in the consumption of nutrients and vitamins have concluded that females do so to a greater extent than males (Table 10.1.3.4).

Table 10.1.3.4. Consuming nutrients and vitamins.

Nature of Any Difference	Prepubertal	Postpubertal
	Childhood	Adult
Males more	**EUROPE** *The Netherlands*: Wiersinga et al. 2001 (iodine)	
No signif. difference		
Females more		**NORTH AMERICA** *United States*: Karasik et al. 2003:311 (calcium); Cleary et al. 2004:56 (vitamins) **RODENT** *Rat*: Schulkin 1991 (calcium); Reilly & Schulkin 1993 (calcium)

10.1.3.5. Consuming Prescription Drugs in General

Most studies have found that females consume (or purchase) prescription drugs to a greater extent than males, although a few studies have concluded that there are no significant gender differences in this regard (Table 10.1.3.5).

Table 10.1.3.5. Consuming prescription drugs in general.

Nature of Any Difference	Postpubertal		Multiple Age Categories
	Adolescent	Adult	
Males more			
No signif. difference	**NORTH AMERICA** *Canada*: Popham 1970	**NORTH AMERICA** *United States*: H Koch 1982:6* (young)	
Females more		**EUROPE** *Britain*: Ashton 1991 (psychotropic drugs) *Netherlands*: Gijsbers van Wijk 1991* **NORTH AMERICA** *United States*: H Koch 1982:6*; Murtagh & Hubert 2004:1409 (elderly); H Tabenkin et al. 2004	**EUROPE** *Britain*: M Blaxter 1990 **NORTH AMERICA** *United States*: Sheehan & Sheehan 1987* (anxiety patients); Simoni-Wastila 2000:291 **INTERNATIONAL** *Multiple Countries*: Linden et al. 1999 (psychotropic drugs)

10.1.3.6. Consuming Mood or Behavior Altering Drugs in General

Nearly all available research has concluded that females are more likely than males to consume mood altering drugs (Table 10.1.3.6).

Table 10.1.3.6. Consuming mood or behavior altering drugs in general.

Nature of Any Difference	Postpubertal	Multiple Age Categories
	Adult	
Males more		
No signif. difference	**NORTH AMERICA** *United States*: Robbins & Clayton 1989:207 (elderly, psychoactive drugs)	
Females more	**EUROPE** *England*: Ashton 1991; *Several European Countries*: Balter et al. 1974 (P) **NORTH AMERICA** *Canada*: Cooperstock 1971 (prescription); RG Smart & Fejer 1972 (P); Cooperstock 1976 (P); *United States*: Gurin et al. 1960; Manheimer et al. 1968 (prescription); CD Chambers 1971 (prescription); Parry et al. 1973 (prescription); PJ Bush & Rabin 1976 (over the counter); Suffet & Brotman 1976; Gomberg 1979:208 (prescription) **INTERNATIONAL** *Multiple Countries*: Linden et al. 1999	**EUROPE** *Sweden*: TM Jorgensen et al. 1993; Takala et al. 1993; *Netherlands*: Van der Waals et al. 1993 **NORTH AMERICA** *United States*: Cooperstock 1971; Abelson et al. 1973; Mellinger et al. 1978; Cottler & Robins 1983; KB Wells et al. 1985; Svarstad et al. 1987; Hohmann 1989; Cafferata & Meyers 1990; Swartz et al. 1991b; Willcox et al. 1994; Simoni-Wastila 1998 **OCEANIA** *Australia*: IL Rowe 1973

10.1.3.7. Consuming Tranquilizers

According to one study, the consumption of tranquilizers is more common among females than among males (Table 10.1.3.7).

Table 10.1.3.7. Consuming tranquilizers.

Nature of Any Difference	Postpubertal
	Adult
Males more	
No signif. difference	
Females more	**MIIDDLE EAST** *Lebanon*: Karam et al. 2000:192 (college)

10.1.3.8. Consuming Antidepressants

Mixed results have been obtained regarding any gender differences in the consumption of antidepressants (Table 10.1.3.8).

Table 10.1.3.8. Consuming antidepressants.

Nature of Any Difference					Postpubertal
					Adult
Males more					**EUROPE** *Britain*: Ashton 1991
No signif. difference					**NORTH AMERICA** *United States*: Roeloffs et al. 2001:1252 (depressed patients)
Females more					**EUROPE** *Sweden*: Bergh et al. 2003 (elderly) **NORTH AMERICA** *United States*: Tabenkin et al. 2004

10.1.3.9. Consuming Blood Pressure Medication

The taking of blood pressure medication was found by one study not to differ for males or females with high blood pressure (Table 10.1.3.9).

Table 10.1.3.9. Consuming blood pressure medication.

Nature of Any Difference					Postpubertal
					Adult
Males more					
No signif. difference					**NORTH AMERICA** *United States*: Cleary et al. 2004:50 (persons with high blood pressure)
Females more					

10.1.3.10. Consuming Barbiturates

According to available evidence, females are more likely than males to consume barbiturates (Table 10.1.3.10).

Table 10.1.3.10. Consuming barbiturates.

Nature of Any Difference				Postpubertal
				Adolescent
Males more				
No signif. difference				
Females more				**MIDDLE EAST** *Lebanon*: Karam et al. 2000:192 (college) **NORTH AMERICA** *United States*: Pascale & Evans 1993:113

10.1.3.11. Consuming Analgesics/Pain Relievers

Mixed results have been obtained with regard to any gender differences in the consumption of analgesics (Table 10.1.3.11).

Table 10.1.3.11. Consuming analgesics/pain releivers.

Nature of Any Difference					Postpubertal
					Adult
Males more					**ASIA** *China*: Chia et al. 2002 (opioids postoperatively)
No signif. difference					
Females more					**EUROPE** *Sweden*: Antonov & Isacson 1996 (analgesics); HI Andersson et al. 1999 (analgesics)

10.1.4. Alcohol Ingesting (Excluding Alcoholism)

Alcohol ingestion is widespread throughout most human populations, with the main exception of Muslim countries, where the practice is illegal. Below, studies are cited that have compared males and females with reference to general alcohol consumption as well as the tendency to drink to the point of drunkenness.

10.1.4.1. Alcohol Consumption in General

A tremendous amount of research has compared the sexes regarding the overall tendency to drink alcohol. As one can see from Table 10.1.4.1a, the vast majority of adolescent humans have concluded that males are more likely than females to drink alcohol at least occasionally. According to a few studies, this gender gap has been modestly narrowing at least in the United States since the 1950's (Cahalan et al. 1969; Wechsler & McFadden 1976; WR Downs 1987; HR White & Huselid 1997).

Split-Table 10.1.4.1a. Alcohol consumption in general by adolescents.

Nature of Any Difference				Postpubertal	
				Adolescent	
Males more				**AFRICA** *South Africa*: AJ Flisher et al. 2003:61 (among Blacks) **ASIA** *Hong Kong*: Lo & Globetti 1999 (high school); *Russia*: Knyazev et al. 2004:833* **EUROPE** *Britain*: PM Kohn & Annis 1977; *Estonia*: Merenakk et al. 2003:1509; *Multiple European Countries*: Hibell et al. 2000* (in 29 out of 30 countries); *Norway*: Pedersen & Kolstad 2000 (among Muslim immigrants); Oia 2003 (among immigrants); Amundsen et al. 2005:1458; *Spain*: Villalbi 1995 **NORTH AMERICA** *United States*: Forslund & Gustafson 1970 (high school); Rachal et al. 1975; Wechsler & McFadden 1976; Wilsnack & Wilsnack 1978; Lassey & Carlson 1979WR Downs & Robertson 1982; KN Thompson & Wilsnack 1984:37; WR Downs 1987; Fagan & Pabon 1990:331; Pascale & Evans 1993:113; JA Lee et al. 1997; JG Barber et al. 1998; Alaniz et al. 1999 (Mexican-Americans); Grunbaum et al. 2000 (alternative school attendees); CS Martin et al. 2000; L Johnston et al. 2003* (from 1975-2001); TF Locke 2003:55; KE Miller et al. 2003 **RODENT** *Rat*: Lancaster 1998* (animals separated from mother neonatally)	
No signif. difference				**EUROPE** *Multiple European Countries*: Hibell et al. 2000* (in 1 out of 30 countries) **NORTH AMERICA** *United States*: Knupfer 1964; Newcomb et al. 1986; Newcomb & McGee 1989; Dolcini & Adler 1994:500; Simons-Morton et al. 1999 (8th graders) **RODENT** *Rat*: FE Lancaster 1998* (with repeated exposure)	
Females more				**EUROPE** *Sweden*: Byqvist 1999 **NORTH AMERICA** *United States*: FE Lancaster 1998* (during initial exposure); L Johnston et al. 2003* (in 2002)	

Nearly all of the numerous studies of adult (or multiple-ages) sex differences in alcohol consumption among humans have revealed that males consume more (or do so more regularly) than is true for females.

Considerable research on sex differences in alcohol consumption among rodents has taken place. Split-Table 10.1.4.1b reveals that female rats voluntarily ingest more alcohol than do males in most studies. This sex difference remains even when alcohol consumption is adjusted for body weight.

Split-Table 10.1.4.1b. Alcohol consumption in general by adults.

Nature of Any Difference	Postpubertal	Multiple Age Categories
	Adult	
Males more	**AFRICA** *Kenya*: Odek-Ogunde & Pande-Leak 1999 (college); *South Africa*: Peltzer et al. 2002:109 (college) **ASIA** *China*: Anson & Sun 2002:1046; *Japan*: Suwake 1985:128; *Russia*: Knyazev et al. 2004:833* (young); *Singapore*: Isralowitz & Hong 1989 (college) **EUROPE** *Britain*: Edwards et al. 1972; Orford et al. 1974 (college); Cartwright et al. 1978; Anderson 1984 (college); Orford & Keddie 1985 (positive reasons); Ingle & Furnham 1996 (college); M Morgan et al. 1977; *Denmark*: TK Jensen et al. 1998:995; *Finland*: Haavio-Mannila et al. 1990 (college); *Ireland*: PS Parfrey 1977 (college); *Netherlands*: de Bruin et al. 2005:658; *Norway*: Keller & Gurioli 1976; *Poland*: RC Engs et al. 1991* (per week); *Sweden*: P Milton 1994; Bendtsen et al. 2002:24 (parents of alcoholics); Romelsjo & Lundberg 1996:1317; Byqvist 1999 **LATIN AMERICA** *Columbia*: G Marin 1976 (college) **MIDDLE EAST** *India*: G Singh & RP Singh 1979 (college); Parameswaran & Rao 1983 (college); *Lebanon*: Karam et al. 2000:192 (college) **NORTH AMERICA** *Canada*: Lamontagne et al. 1979 (college); JE Lapp 1984 (college); Single & Wortley 1993; Svenson et al. 1994 (college); Adlaf & Smart 1995 (elderly); DeWit et al. 1999:110 (Aboriginal Americans); Gliksman et al. 1997 (college); Bonin et al. 2000:155; M Denton et al. 2004:2592; *United States*: R Straus & Bacon 1953 (college); Ullman 1957 (high school); Cahalan et al. 1969; EM Rogers 1970 (college); Glassco 1975 (college); G Marin 1976 (college); Wechsler & McFadden 1976; Engs 1977 (college); Hockhauser 1977 (college); Hinrichs & Haskell 1978 (college); Marini 1978b:495; MS Kaplan 1979 (college); Wechsler & McFadden 1979 (college); Biber et al. 1980 (college); Ferrence 1980 (college); Iutcovich & Iutcovich 1982 (college); PB Johnson 1982; Kozicki 1982 (college); Oshodin 1982 (Nigerian college students); Trotter 1982 (college); Barnes & Welte 1983 (college); KH Beck 1983 (college); Mills & McCarthy 1983 (college); JS Peterson & Allen 1983 (college); Achalu & Duncan 1984 (college, exchange students from Nigeria); SP Hughes & Dodder 1984 (college); Wilsnack et al. 1984 (college); Shore 1985; Beckman & Amaro 1986 (alcoholics); Richman & Flaherty 1986 (medical school); M Temple 1986 (college); AD Berkowitz & Perkins 1987 (college); Chomak & Collins 1987; WR Downs 1987; Lennon 1987:295; Engs & Hanson 1988 (college); LN Robins et al. 1988; Carver et al. 1989; Haworth-Hoeppner et al. 1989 (college); AA Moore et al. 1989 (elderly); Robbins 1989:117; Mercer & Khavari 1990 (college); TM O'Hare 1990 (college); Wilks & Callan 1990; RC Engs et al. 1991* (more per week); RJ Williams & Wortley 1991 (young); ML Cooper et al. 1992 (college); DA Dawson & Archer 1992 (among non-alcoholics); JD Hawkins et al. 1992; Parker & Harford 1992; Almog et al. 1993; DA Dawson 1993; WC Gross 1993 (college); CA Robbins & Martin 1993; Bliss & Crown 1994:230; AC Brooks 1994; DA Dawson et al. 1995; Lo 1995 (young); BS Thomas 1995; Wechsler et al. 1995 (college); WL Adams et al. 1996 (elderly); Liu & Kaplan 1996; Ray & Gold 1996 (college); RJ Williams & Ricciardelli 1996; Polednak 1997 (among Hispanics); WA Clark 1998 (college); Grunbaum et al. 1998:155 (Whites); Lo & Bissler 1998 (college); RJ Williams et al. 1998; McCreary et al. 1999; Treno et al. 2000:544; Roeloffs et al. 2001 (depressed patients); SL Lawyer et al. 2002; O'Malley & Johnston 2002:31; Wechsler et al. 2002:209; Karasik et al. 2003:311; Graham et al. 2004; Green et al. 2004; Murtagh & Hubert 2004:1409 (elderly); Stranges et al. 2004:951 (middle age/elderly, past 30 days) **OCEANIA** *Australia*: P Wilkinson et al. 1969; P Wilkinson et al. 1971; Engs 1982 (college); JP Connor et al. 1999; T Stockwell et al. 2002; *New Zealand*: Casswell et al. 1993 **INTERNATIONAL** *Multiple Countries*: Helzer & Canino 1992; *Several European Countries*: Knibbe & Bloomfield 2001 **RODENT** *Hamsters*: HB Moss et al. 1987; *Rat*: Webb et al. 2002	**EUROPE** *Britain*: Orford & Keddie 1985; Schoenborn 1986; KM Filmore 1987a; KM Filmore 1987b; Chou & Pickering 1992; DA Dawson & Archer 1992; KM Filmore et al. 1992; DA Dawson 1993; Marmot & D Smith 1997; *Denmark*: Saelan et al. 1992; *Finland*: Pietinen et al. 1996a; Helakorpi et al. 1999; *Netherlands*: Neve et al. 1996; Bongers & van Oers 1998:283 (self-report); Holly & Wittchen 1998; *Spain*: Alvarez & del Rio 1994 **MIDDLE EAST** *India*: G Singh 1989; *Israel*: Rahan et al. 1999:1215; *Jordon*: S. Weiss et al. 1999:189 **NORTH AMERICA** *Canada*: Bondy 1993; Single & Wortley 1993; Kunz & Glesbrecht 1999 (Indo-Pakistanis in Canada); *United States*: Warheit et al. 1976:228; Mail & McDonald 1980 (Native Americans); Lee-Feldstein & Harburg 1982:828; ME Hilton 1987; US Department of Health & Human Services 1987b:20; ME Hilton 1988a&b; Robins 1989; Markides et al. 1990 (Mexican Americans); Caetano & Kaskutas 1995:560; Califano 1996; Minugh et al. 1998:491; Chatham et al. 1999 (heroin addicts); Kafai & Ganji 2003:15 (self-report) **OCEANIA** *Australia*: T Stockwell et al. 2004 **INTERNATIONAL** *Several European Countries*: Hupkens et al. 1993; Holly & Wittchen 1998
No signif. difference	**NORTH AMERICA** *United States*: DJ Hanson 1977 (college); E Banks & Smith 1980 (college); Reiskin & Wechsler 1981 (college, students seeking mental health services); Kodman & Stumak 1984 (college); Windle 2003 (college); Marczinski et al. 2005:388 (college, per week, among drinkers, adjusted for body weight) **RODENT** *Rat*: Juarez & Barrios deTomasi 1999 (absolute volume); Sluyter et al. 2000* (strain with low susceptibility to apomorphine)	**EUROPE** *Slovenia*: Kolsek 1994:55 **NORTH AMERICA** *United States*: Gabrielli & Plomin 1985:28 (weight-corrected)
Females more	**NORTH AMERICA** *United States*: MB Pollock 1969 (college); Kuder & Madson 1976 (college); Strange & Schmidt 1979 (college); Friend & Koushki 1984 (college) **PRIMATE (EXCEPT APE)** *Vervet Monkey*: J Juarez et al. 1993 **RODENT** *Mice*: BC Jones & Whitfield 1995; *Rat*: Li & Lumeng 1984; N Adams et al. 1991; FE Lancaster & Spiegel 1992a:415 (per body weight, greater increase in intake with higher alcohol concentrations); FE Lancaster & Speigel 1992b:9 (per body weight); BA Blanchard et al. 1993 (voluntarily); N Adams 1995 (after tail pinch); BA Blanchard & Glick 1995 (voluntarily); FE Lancaster et al. 1996 (with juvenile exposure to non-alcoholic beer); Almeida et al. 1998; FE Lancaster 1998* (with or without neonatal handling); Juarez & Barrios de Tomasi 1999* (per body weight); Sluyter et al. 2000* (strain highly susceptible to effects of apomorphine); Cailhol & Mormede 2001; Sarviharju et al. 2001; M Ford et al. 2002; Piano et al. 2005	**RODENT** *Rat*: Li & Lumeng 1984; RJ Blanchard et al. 1987; N Adams et al. 1991; Mankes et al. 1991; N Adams 1995 (Maudsley strain); FE Lancaster et al. 1996

10.1.4.2. Amount of Alcohol Consumed

Studies of the amount of alcohol consumed per a given unit of time (usually within a typical week) have nearly unanimously concluded that males on average consume greater quantities of alcohol than do females (Table 10.1.4.2). It should be noted that several studies (reviewed in Chapter 1) have indicated that males and females metabolize alcohol differently (also see Lex 1991:124). For this reason and because males are somewhat larger than females, males may be physiologically able to consume more alcohol before experiencing any of its effects.

Table 10.1.4.2. Amount of alcohol consumed.

Nature of Any Difference	Postpubertal
	Adult
Males more	**EUROPE** *Britain*: Orford et al. 1974 (college); Smart & Schmidt 1975 (college); P Anderson 1984 (college) **NORTH AMERICA** *United States*: Rachel et al. 1975 (college); Kuder & Madson 1976 (college); Engs 1977 (college); Hockhauser 1977 (college); Wilsnack & Wilsnack 1978 (college); FE Hill & Gugen 1979 (college); MS Kaplan 1979 (college); Roizen et al. 1979 (college); Scheller-Gilkey et al. 1979 (college); Strange & Schmidt 1979 (college); Wechsler & McFadden 1979 (college); Biber et al. 1980 (college); RA Perkins et al. 1980 (college); Wechsler & Rodman 1981 (college); Iutcovich & Iutcovich 1982 (college); Trotter 1982 (college); GM Barnes & Welte 1983 (college); KH Beck 1983 (college); JS Peterson & Allen 1983 (college) **OCEANIA** *Australia*: Engs 1982 (college)
No signif. difference	**NORTH AMERICA** *United States*: Reiskin & Wechsler 1981 (college, mental health services patients)
Females more	

10.1.4.3. Alcohol Abstinence

Persons who abstain from consuming alcohol either do so entirely or nearly so. Table 10.1.4.3 indicates that females are more likely to be abstainers than are males except among adolescents.

Table 10.1.4.3. Alcohol abstinence.

Nature of Any Difference	Postpubertal		Multiple Age Categories
	Adolescent	Adult	
Males more			
No signif. difference	**NORTH AMERICA** *United States*: Hops et al. 1999:25		
Females more		**EUROPE** *Sweden*: Bergmark 2004 **NORTH AMERICA** *United States*: ME Hilton 1991a (fewer than 12 drinks per year); York & Welte 1993:748 (college); DA Dawson et al. 1995 (fewer than 12 drinks per year); Stranges et al. 2004:951 (middle age/elderly)	**ASIA** *China*: Yi et al. 2003:77 **NORTH AMERICA** *Canada*: M Denton et al. 2004:2592; *United States*: Riley & Marden 1947; Riley et al. 1948; Maxwell 1952; Maxwell 1958; Mulford & Miller 1963a; Knupfer & Room 1964; Mulford 1964; Cahalan & Cisin 1968; Room 1972; Barnes & Russell 1978; Celentano & McQueen 1978a; Celentano & McQueen 1978b; Wechsler et al. 1978

10.1.4.4. Consuming Beer

Most alcoholic beverages can be classified as beer, wine, and spirits (with the latter usually including a large number of so-called mixed drinks). Several studies have compared the sexes with respect to the consumption of beer as opposed to the other two types. Table 10.1.4.4 shows that among persons who drink, males are more likely to consume beer than are females (the latter being more likely to consume alcohol in the form of wine or mixed drinks).

Table 10.1.4.4. Consuming beer.

Nature of Any Difference					Postpubertal	
						Adult
Males more						**EUROPE** *Britain*: P Anderson 1984 (college, among drinkers) **NORTH AMERICA** *United States*: Straus & Bacon 1953 (college, among drinkers); Engs 1977 (college, among drinkers); Wechsler & McFadden 1979 (college, among drinkers); E Banks & Smith 1980 (college, among drinkers); Biber et al. 1980 (college, among drinkers); Reiskin & Wechsler 1981 (college, among drinkers); Wechsler & Rohman 1981 (college, among drinkers); Trotter 1982 (college, among drinkers); Engs & Hanson 1985 (college, among drinkers) **OCEANIA** *Australia*: Engs 1982 (college, among drinkers)
No signif. difference						**NORTH AMERICA** *United States*: Strange & Schmidt 1979 (college, among drinkers)
Females more						

10.1.4.5. Age of Onset of Alcohol Consumption

All pertinent studies indicate that males begin drinking alcohol at an earlier age than do females (Table 10.1.4.5). This appears to be true both for persons in general and for persons classified as drug addicts.

Table 10.1.4.5. Age of onset of alcohol consumption.

Nature of Any Difference					Postpubertal	
					Adolescent	Adult
Males start earlier					**NORTH AMERICA** *United States*: Pope et al. 1994:359; SC Duncan et al. 1996	**EUROPE** *Britain*: Wanberg & Knapp 1970 (young) **NORTH AMERICA** *United States*: J Wall 1937 (young); Lisansky 1957 (young); Winokur & P Clayton 1968 (young); Rimmer et al. 1971 (young); G Garrett & H Bahr 1973 (young); Bromet & Moos 1976 (young); Anglin et al. 1987b (among drug addicts); Hser et al. 1987c (among drug addicts); B Grant & Dawson 1997
No signif. difference						
Females start earlier						

10.1.4.6. Exhibiting Alcohol-Related Problems

Drinking to the point of being drunk, getting into fights or failing to remember what happened the following day are fairly common examples of what would be termed "alcohol-related problems." As shown in Table 10.1.4.6, these problems are considerably more common among males than among females.

Table 10.1.4.6. Exhibiting alcohol-related problems.

Nature of Any Difference					Postpubertal		Multiple Age Categories
					Adolescent	Adult	
Males more					**NORTH AMERICA** *United States*: HR White 1987	**EUROPE** *Ireland*: Farragher et al. 1994 (elderly) **NORTH AMERICA** *Canada*: McCreary et al. 1999; *United States*: Kuder & Madson 1976 (college); Reiskin & Wechsler 1981 (college);Walfish et al. 1981 (college); Kozicki 1982 (college); JS Peterson & Allen 1983 (college); Engs & Hanson 1990:42 (college) Hasin et al. 1990; Regier et al. 1990b; Wechsler et al. 1995a (college); O'Hare 1998 (college); Caetano et al. 2000 (partner violence); DA Dawson et al. 2005 (stress related) **RODENT** *Rat*: Devaud & Chadda 2001 (developed alcohol dependence faster)	**EUROPE** *Finland*: Makela 1998 (death); Makela 1999:870 (death); *Sweden*: Romelsjo & Lundberg 1996 (hospitalization) **NORTH AMERICA** *Canada*: Room et al. 1995; *United States*: Riley & Marden 1947; Riley et al. 1948; M Maxwell 1958; Mulford & Miller 1959; Mulford & Miller 1960a; Mulford & Miller 1960b; Mulford & Miller 1960c; Mulford & Miller 1963a; Mulford & Miller 1963b; Bailey et al. 1965; Cahalan & Cisin 1968; Cahalan et al. 1969; Cahalan 1970; Cahalan 1976; Celentano & McQueen 1978a; Celentano & McQueen 1978b; Makela & Simpura 1985; Harford et al. 1991
No signif. difference						**NORTH AMERICA** *United States*: WM Cox & Baker 1982 (college)	
Females more					**NORTH AMERICA** *United States*: TF Locke & Newcombe 2003:61 (dysphoria)		

10.1.4.7. Light to Moderate Drinking

Drinking alcohol only once or twice a week, especially on social occasions, is usually considered light to moderate (or social) drinking. As shown in Table 10.1.4.7, most studies have not found a statistically significant difference between males and females in this regard.

Table 10.1.4.7. Light to moderate drinking.

Nature of Any Difference					Postpubertal
					Adult
Males more					**EUROPE** *Netherlands*: de Bruin et al. 2005:658
No signif. difference					**ASIA** *Israel*: RW Wilsnack et al. 2000* (social drinking) **EUROPE** *Czech Republic*: RW Wilsnack et al. 2000* (social drinking); *Estonia*: RW Wilsnack et al. 2000* (social drinking); *Finland*: RW Wilsnack et al. 2000* (social drinking); *Holland*: RW Wilsnack et al. 2000* (social drinking); *Sweden*: RW Wilsnack et al. 2000* (social drinking) **NORTH AMERICA** *Canada*: RW Wilsnack et al. 2000* (social drinking); *United States*: RW Wilsnack et al. 2000* (social drinking); O'Malley & Johnston 2002:31 **OCEANIA** *Australia*: RW Wilsnack et al. 2000* (social drinking)
Females more					

10.1.4.8. Excessive/Heavy Alcohol Consumption (Drunkenness/Intoxication/Alcohol Abuse)

Numerous studies have investigated gender differences in the tendency to drink alcohol to the point of being drunk. Table 10.1.4.8 shows that the overwhelming majority of these studies have concluded that males are more likely to do so than are females, with Spain being a possible exception.

Table 10.1.4.8. Excessive/heavy alcohol consumption (drunkenness/intoxication/alcohol abuse).

Nature of Any Difference				Postpubertal		Multiple Age Categories
				Adolescent	Adult	
Males more				**NORTH AMERICA** *United States*: GM Barnes & Welte 1986; Kann et al. 1993; LS Bensley et al. 1999b; TF Locke & Newcomb 2003:55; JM Wallace 2003 (multiple ethnic groups)	**EUROPE** *Britain*: G Edwards et al. 1972; *Italy*: Tenconi et al. 1992:767; *Sweden*: Bergmark 2004 **MIDDLE EAST** *Lebanon*: Karam et al. 2000:192 (college) **NORTH AMERICA** *Canada*: Svenson et al. 1994 (college); Rehm et al. 1999; Bonin et al. 2000:155; SS Martins et al. 2004 (among pathological gamblers); *United States*: FL Fitzgerald et al. 1968 (young); Cahalan et al. 1969; Engs 1977 (young); Reiskin & Wechsler 1981 (college); K Fillmore 1984 (middle age); RJ Canterbury et al. 1992:213 (college); D Dawson & L Archer 1992:119 (college); Richman & Rospenda 1992; Weisner & Schmidt 1993; H Wechsler et al. 1995b (young); DA Dawson 1996b (among alcoholics); AV Horwitz et al. 1996 (young); Nunes-Dinis & Weisner 1997 (among arrestees); Humara & Sherman 1999 (young); Greenfield & Rogers 1999; McDonough & Walters 2001; CJ Wong et al. 2002 (among those with cocaine dependence); Wechsler et al. 2002:209 (young); Windle 2003 (college, on a daily basis);Tammemagi et al. 2004:600 (among lung cancer patients) **INTERNATIONAL** *Multiple Countries*: RW Wilsnack et al. 2000	**EUROPE** *Netherlands*: vanOers et al. 1999:84; *Spain*: Borrell et al. 2000:26 **LATIN AMERICA** *Brazil*: Andrade et al. 2002; *Mexico*: Natera-Rey et al. 2001 **NORTH AMERICA** *United States*: Presley et al. 1996:13; Robles et al. 1998; O'Malley & Johnston 2002:30
No signif. difference				**EUROPE** *Spain*: Villalbi 1995:270	**EUROPE** *Spain*: Suris & Parera 2005:487	
Females more						

10.1.4.9. Binge Drinking

Binge drinking involves consuming five or six drinks within a few hours. All available evidence suggests that males engage in binge drinking to a greater degree than females (Table 10.1.4.9).

Table 10.1.4.9. Binge drinking.

Nature of Any Difference				Postpubertal		Multiple Age Categories
				Adolescent	Adult	
Males more				**NORTH AMERICA** *United States*: Windle 1990; GM Barnes et al. 2002a **OCEANIA** *Guam*: Pinhey & Millman 2004	**EUROPE** *Sweden*: Bergmark 2004 **NORTH AMERICA** *Canada*: Bonin et al. 2000:155; *United States*: AR Meyers et al. 1982 (elderly, self-rated); GM Barnes et al. 1992 (young); Wechsler 1992 (college); Wechsler et al. 1995a (college); Wechsler et al. 1995b (college); Wechsler et al. 1998 (college); Windle 2003 (college)	**EUROPE** *Britain*: Orford & Keddie 1985 **NORTH AMERICA** *United States*: Armor et al. 1978; Van Thiel & Gavaler 1985; S Crawford & Ryder 1986
No signif. difference						
Females more						

10.1.4.10. Being Drunk in Public Places

One study of gender differences in public drunkenness among adolescents concluded that this behavior was more common in females than in males (Table 10.1.4.10).

Table 10.1.4.10. Being drunk in public places.

Nature of Any Difference	Postpubertal
	Adolescent
Males more	
No signif. difference	
Females more	**NORTH AMERICA** *United States*: R Marcus 1999

10.1.4.11. Drinking Because of Stress or Sadness

A few studies have sought to determine if one sex is more likely than the other to drink alcohol due to stress or sadness. Table 10.1.4.11 indicates that this tendency is greater among females than among males.

Table 10.1.4.11. Drinking because of stress or sadness.

Nature of Any Difference	Postpubertal	
	Adolescent	Adult
Males more		
No signif. difference		
Females more	**NORTH AMERICA** *United States*: Windle & Barnes 1988; Marczinski et al. 2005 (college); Poulin et al. 2005	**NORTH AMERICA** *United States*: Hussong et al. 2001 (young); AC King et al. 2003 (among alcoholics)

10.1.4.12. Drinking Because of Permissive Social Atmosphere

A few studies have determined that a permissive social atmosphere promotes the consumption of alcohol more for males than for females (Table 10.1.4.12).

Table 10.1.4.12. Drinking because of permissive social atmosphere.

Nature of Any Difference	Postpubertal
	Adult
Males more	**NORTH AMERICA** *United States*: Ratliff & Burkhart 1984 (college); Dunne et al. 1993 (among alcoholics); KH Beck et al. 1995 (college)
No signif. difference	
Females more	

10.1.4.13. Energy Invested to Obtain Alcohol

The one study located on energy expended in obtaining alcohol involved adult rats. When the concentration of alcohol was low in the solution made available, males work harder than females to access the alcohol-bearing solution (Table 10.1.4.13).

Table 10.1.4.13 Energy invested to obtain alcohol.

Nature of Any Difference	Postpubertal
	Adult
Males expended more	**RODENT** *Rat*: van Haaren & Anderson 1994a* (fixed interval availability)
No signif. difference	
Females expended more	

10.1.5. Tobacco Ingesting

The consumption of tobacco, usually by smoking it, has been practiced for centuries. As shown below, many studies have compared males and females with respect to this practice.

10.1.5.1a. Smoking Cigarettes in General (Prepubertal and Adolescents)

Because of the very large number of studies that have reported gender differences in smoking rates, results are presented in three Split-Tables, one for adolescents, a second for adults, and a third for combinations of multiple age categories. Nearly all studies of smoking are based on self-reports and usually stipulate some degree of regularity in the behavior (rather than simply having tried smoking once or twice). As one can see from Split-Table 10.1.5.1a, the evidence is mixed with respect to any adolescent gender differences in rates of smoking.

Split-Table 10.1.5.1a. Smoking cigarettes in general (prepubertal and adolescents)

Nature of Any Difference	Prepubertal				Adolescent
				Childhood	
Males more				**NORTH AMERICA** *United States*: Davis et al. 1995 (5th-7th grade, American Indians)	**AFRICA** *Nigeria*: Elegbeleye & Femi-Pearse 1976; *Malaysia*: Thambypillai 1985 (rural community); AJ Flisher et al. 2003:61* (among Blacks & Coloreds) **ASIA** *China*: Li et al. 1996; *Korea*: Youn 1996:634; *Russia*: Knyazev et al. 2004:833 **EUROPE** *Denmark*: Arnett & Jensen 1994:10; *Estonia*: Merenakk et al. 2003:1509; *Netherlands*: Stolk et al. 1996:314 (elderly) **NORTH AMERICA** *United States*: D Horn et al. 1959; EC Hammond 1966; RW Wilson 1967:2*; EE Levitt & Edwards 1969; Galli 1973 (junior high); Brunswick 1980; Kellam et al. 1980; Kann et al. 1993; Pascale & Evans 1993:113; Rudolph 1996; Epstein et al. 1998* (Asian sample); Harrell et al. 1998; Hodge 2001 (American Indians); JM Wallace 2003* (all ethnic groups except American Indians)
No signif. difference					**EUROPE** *France*: Bosanquet & Magee 1999:602; *Scotland*: Glendinning et al. 1994*; *Spain*: Villalbi 1995:269 *Sweden*: Haggstrom-Nordan et al. 2002: 291 **NORTH AMERICA** *United States*: Abelson et al. 1977; DB Kandel 1980a; JC Anthony et al. 1994; Arnett & Jensen 1994:10; L Johnston et al. 1994; Tinsleyet al. 1995: 249; Epstein et al. 1998* (Whites); JM Wallace et al. 1999 (African-American students); Atkins et al. 2002:202; NJ Kaufman et al. 2002
Females more					**AFRICA** *South Africa*: AJ Flisher et al. 2003:61* **EUROPE** *Britain*: A Diamond & Goddard 1995; *Denmark*: Arnett & L Jensen 1994; *Netherlands*: Bernaards et al. 2001; *Spain*: Campins et al. 1996; Pinilla & Gonzalez 2001; Suris & Parera 2005:487; *Multiple European Countries*: Kolip & Schmidt 1999 (Wales, Denmark, Germany, Spain) **NORTH AMERICA** *United States*: A. Williams 1973; RY Cohen et al. 1990; Ingersoll et al. 1993:73; Dolcini & Adler 1994:500; Epstein et al. 1998* (Blacks & Hispanics); JM Wallace 2003 (American Indians) **OCEANIA** *Australia*: D Hill et al. 1999

10.1.5.1b. Smoking Cigarettes in General (Adult)

For adults, the findings are much more consistent in suggesting that males smoke to a greater extent than females, although quite a few studies report either no significant gender difference or higher smoking rates among females (Split-Table 10.1.5.1b).

Split-Table 10.1.5.1b. Smoking cigarettes in general (adult).

Nature of Any Difference	Adult
Males more	**AFRICA** *Kenya*: Odek-Ogunde & Pandeleak 1999 (college); *South Africa*: Peltzer et al. 2002:109 (college) **ASIA** *Russia*: Knyazev et al. 2004:833 (young); *Taiwan*: Hsu et al. 2002:58 **EUROPE** *Britain*: Jarvis & P Jackson 1988; N Hart 1989; Ingle & Furnham 1996 (college); *Finland*: Pyorala et al. 1985; T Martelin et al. 2004; *Italy*: LaVecchia 1986b; *Netherlands*: VanReek 1984; *Scotland*: Glendinning et al. 1994* (young); *Spain*: Berrino et al. 1988; Pinilla & Gonzalez 2001*; *Sweden*: Statistics Sweden 1965; Mills 2003; *Switzerland*: Berrino et al. 1988; Etter et al. 2002; *United Kingdom*: Capell 1980; VanReek 1984; Wald et al. 1988 **NORTH AMERICA** *Canada*: Ferrence 1988; M Denton et al. 2004:2592; *United States*: Retherford 1975; Monto & Ross 1977:106; US Dept. of Health, Education & Welfare1979; US Dept. of Health & Human Services 1980; KE Warner & Murt 1982; J Harris 1983; US Dept. of Health & Human Services 1983; J Pierce et al. 1987; US Dept. of Health & Human Services 1987c; Novotny et al. 1988; Center for Disease Control 1992a (Asian Americans); Campos-Outcalt et al. 1995 (American Indians); Garfinkel 1997; Osler et al. 1999; Leischow et al. 2000; Karasik et al. 2003:311; Stranges et al. 2004:951 (middle age/elderly); Tammemagi et al. 2004:600(lung cancer patients) **OCEANIA** *Australia*: D Hill et al. 1988 **MIDDLE EAST** *Lebanon*: Karam et al. 2000:191 (college) **INTERNATIONAL** *Multiple Countries*: J Pierce 1989
No signif. difference	**NORTH AMERICA** *United States*: Breslau et al. 1994; Gibbons & Gerrard 1995* (young); KD Ward et al. 2002:262 (US Air Force Recruits, Hispanics) **OCEANIA** *Australia*: S Moore & D Rosenthal 1992* (young) **INTERNATIONAL** *Multiple Countries*: Steptoe et al. 1995 (21 countries included)
Females more	**EUROPE** *Denmark*: M Rasmussen et al. 2002; *Spain*: Pinilla & Gonzalez 2001* (young) **NORTH AMERICA** *United States*: L Johnston et al. 1988 (young); Pirie et al. 1988 (young); Pierce 1989 (young); US Dept. of Health & Human Services 1989 (young); Zuckerman et al. 1990:213; Waldron et al. 1991 (young); KD Ward et al. 2002:262 (US Air Force Recruits, Whites)

10.1.5.1c. Smoking Cigarettes in General (Multiple Age Categories)

Large numbers of studies have been conducted on smoking in which age groups were combined, although nearly all of these studies have been restricted to adolescents and adults. As one can see by viewing Split-Table 10.1.5.1c, the majority of studies have concluded that throughout the world, males are more likely than females to be established smokers.

Split-Table 10.1.5.1c. Smoking cigarettes (multiple age categories).

Nature of Any Difference	Multiple Age Categories
Males more	**AFRICA** *Guyana*: GJ Miller & Ashcroft 1971 **ASIA** *China*: HP Lee et al. 1979; Weng 1988; World Health Organization 2000*; Anson & Sun 2002:1046; Yi et al. 2003:77; *Japan*: JB Cornell 1956; Japanese Ministry of Health & Welfare 1998; *Laos*: World Health Organization 2000*; *Phillipines*: World Health Organization 2000*; *Singapore*: World Health Organization 2000*; *Vietnam*: Trong et al. 1999; World Health Organization 2000*; *Taiwan*: Hsu et al. 2002:58; *Thailand*: Mougne et al. 1982; Sattah et al. 2002:804 (self-reports) **EUROPE** *Belgium*: Smoking Prevention 1994; *Britain*: Wald et al. 1988; JP Pierce 1989:54*; Wald & Nicolaides-Bauman 1991; Smyth & Browne 1992; Argyle 1994:268; *Denmark*: PE Nielsen et al. 1988; TK Jensen et al. 1998:995; *Finland*: Rahkonen et al. 1992; *Germany*: H Brenner 1993; *Ireland*: Cleary et al. 1983; E Shelley 1985; Health Promotion Unit 1995; *Italy*: Tenconi et al. 1992:767 (all ages); *Netherlands*: Van Reek 1985; Van Reek 1994; *Norway*: JP Pierce 1989:54*; M Osler et al. 1998; *Sweden*: JP Pierce 1989:54*; Lindstrom et al. 2000:203 **MIDDLE EAST** *Nepal*: Pandey et al. 1987; *Pakistan*: Z Mahmood 1982 **NORTH AMERICA** *Canada*: Millar 1988; *United States*: Bolinder 1925 (American Indians); JM Cooper 1957 (American Indians); EC Hammond 1966; RW Wilson 1967:2*; Gebbhard & Johnson 1979:93; US Dept. of Commerce 1983:15; Schoenborn 1986; Waldron 1986 (more cigarettes per day); Ernster 1987; JE Fielding 1987; Fiore et al. 1989; Pierce 1989:154*; Center for Disease Control 1992b; Anonymous 1993; Giovino et al. 1994; Patrick et al. 1995 (self-report); DC Walsh et al. 1995:151; Escobedo & Peddicord 1996; Center for Disease Control 1999; Department of Health & Human Services 2001:34; KD Ward et al. 2002:262 (Air Force Recruits, Blacks & Asians); Kafai & Ganji 2003:14; Nez Henderson et al. 2005 (American Indians, 15-54 yrs) **OCEANIA** *Australia*: JP Pierce et al. 1987; DJ Hill et al. 1988; CA Boyle et al. 1994:57; World Health Organization 2000*; *Ceylon*: Uragoda & Senewiratne 1971; *Fiji*: Tuomilehto et al. 1986; *New Guinea*: HR Anderson 1974; Vallance et al. 1987 (rural community) **INTERNATIONAL** *Several Industrial Countries*: JP Pierce 1989; Molarius et al. 2001; Pampel 2001a:397
No signif. difference	**NORTH AMERICA** *Canada*: Choiniere et al,. 2000:515; *United States*: Zuckerman & Neeb 1980; Schoenberg et al. 1990; Osann 1991; Brownson et al. 1992; RE Harris et al. 1993; Osann et al. 1993; Risch et al. 1993; Zang & Wynder 1996 **OCEANIA** *French Polynesia*: World Health Organization 2000*; *New Guinea*: Pindborg et al. 1968; Scrimgeour 1985
Females more	**EUROPE** *Britain*: Marmot & Davey Smith 1997:Table 2 **NORTH AMERICA** *United States*: D Kandel et al. 1997 **OCEANIA** *Cook Island*: Tuomilehto et al. 1986; World Health Organization 2000*

10.1.5.2. Number of Cigarettes Smoked Per Day by Regular Smokers

A few studies have compared the sexes regarding the number of cigarettes smoked among established smokers. Most of these studies have concluded that male smokers consume more cigarettes per day than do female smokers (Table 10.1.5.2).

Table 10.1.5.2. Number of cigarettes smoked per day by regular smokers.

Nature of Any Difference	Postpubertal	
		Adult
Males smoke more		**EUROPE** *Scotland*: Woodward & Tunstall-Pedoe 1993 **NORTH AMERICA** *United States*: MAH Russell et al. 1986; Wagenknecht et al. 1990 (young); KA Perkins et al. 2002:199 **OCEANA** *Australia*: Wilhelm et al. 2002:49 (among depressed smokers)
No signif. difference		
Females smoke more		**EUROPE** *Sweden*: Nordlund et al. 1999:57 (currently regular smokers)

10.1.5.3. Smoking Abstinence

One study was located pertaining to smoking abstinence, meaning that these individuals reported never having smoked in their lives. It found that females were more likely than males to have never smoked (Table 10.1.5.3).

Table 10.1.5.3. Smoking abstinence.

Nature of Any Difference					Postpubertal	
						Adult
More males						
No signif. difference						
More females						**NORTH AMERICA** *United States*: Stranges et al. 2004:951 (middle age & elderly)

10.1.5.4. Age of Smoking Onset

Findings surrounding the age of smoking onset have been fairly evenly split between those that have concluded that males who smoke begin doing so at a younger age than females who smoke.Studies have concluded that no significant gender difference could be found (Table 10.1.5.4).

Table 10.1.5.4. Age of smoking onset.

Nature of Any Difference	Multiple Age Categories
Males younger	**EUROPE** *Britain*: B Cox et al. 1987 **NORTH AMERICA** *United States*: PD Riggs et al. 1999:199
No signif. difference	**EUROPE** *Ukraine*: McAllister et al. 2002:303 **MIDDLE EAST** *Lebanon*: Karam et al. 2000:191 (college) **NORTH AMERICA** *Canada*: Westmaas et al. 2002:371
Females younger	

10.1.5.5. Smoking Cessation (Quitting Smoking by Regular Smokers)

Large numbers of studies have been undertaken to compare male and female smokers with respect to their likelihood of successfully quitting. As one can see in Table 10.1.5.5, among established smokers, nearly all of these studies have concluded that males are more likely to succeed at quitting than females.

Table 10.1.5.5. Smoking cessation (quitting smoking by regular smokers).

Nature of Any Difference	Postpubertal		Multiple Age Categories
	Adolescent	Adult	
Males more		**EUROPE** *Denmark*: Godtfredsen et al. 2001 ("cold turkey"); *Norway*: M Osler et al. 1999; *Sweden*: Norregaard et al. 1993 (using nicotine replacement patch); Nordlund et al. 1999:57; Lindstrom & Isacsson 2002 **NORTH AMERICA** *Canada*: LE Carlson et al. 2002; *United States*: JE Harris 1983; Wingard et al. 1983:167 (Whites); Kabat & Wynder 1987 ("cold turkey"); SM Blake et al. 1989; AC King et al. 1990; McWhorter et al. 1990; AB Berman & Gritz 1991; Fortmann & Killen 1994; Swan et al. 1993 (using behavioral therapy); SA French & Jeffery 1994; Bjornson et al. 1995 (using nicotine replacement patch); RP Murray et al. 1995; Nides et al. 1995 (using nicotine replacement); Fant et al. 1996; EA O'Connor et al. 1996; Hymowitz et al. 1997 (cohort community group); Pirie et al. 1997; Royce et al. 1997; Swan et al. 1997 (using nicotine replacement patch); KD Ward et al. 1997; Wetter et al. 1999 (using nicotine relacement patch); Ockene et al. 2000 (behavioral therapy); Dale et al. 2001 (bupropion & counseling); Assaf et al. 2003 (self-report); Swan et al. 2003 (bupropion & counseling); RX Liu 2004	**EUROPE** *Britain*: Gourlay et al. 1994; *Italy*: Negri et al. 1989; Ferraroni et al. 1991; *Norway*: M Osler et al. 1998; *Sweden*: Lindstrom et al. 2000:203 **NORTH AMERICA** *United States*: JS Guilford 1966; DF Dunn 1973; Sterling & Weinkam 1976:750; US Dept. of Health and Human Services 1980; US Dept. of Health & Human Services 1989; Center for Disease Control 1992b; Stapleton et al. 1995; Gritz et al. 1996; Pierce & Gilpin 1996 **OCEANIA** *Australia*: CA Boyle et al. 1994:57
No signif. difference	**NORTH AMERICA** *United States*: Zhu et al. 1999	**NORTH AMERICA** *United States*: KM Freund et al. 1992; Gritz et al. 1998	**NORTH AMERICA** *United States*: Gilpin et al. 1997; Kiefe et al. 2001
Females more			

10.1.5.6. Severity of Withdrawal Symptoms Associated With Smoking Cessation

Several studies have sought to determine if males or females experience greater withdrawal symptoms when they attempt to quit smoking. Most studies have found no significant difference; those that have concluded that the symptoms for females are more severe (Table 10.1.5.6).

Table 10.1.5.6. Severity of withdrawal symptoms associated with smoking cessation.

Nature of Any Difference	Postpubertal	Multiple Age Categories
	Adult	
More severe for males		
No signif. difference	**NORTH AMERICA** *United States*: RC Gunn 1986*; Pierce et al. 1991 (young); JC Tate et al. 1993	**OCEANIA** *Australia*: Trahair 1967 **NORTH AMERICA** *United States*: Wynder et al. 1967; DJ Peterson et al. 1968; S Shiffman 1979; Svikis et al. 1986; RC Gunn 1986*; Breslau et al. 1992; Hatsukami 1994; Pomerleau et al. 1994; Repsher 1994
More severe for females	**NORTH AMERICA** *United States*: Pomerleau et al. 1994*; Oncken et al. 2004	

10.1.5.7. Reasons Given by Smokers for Smoking

Research pertaining to sex differences as to why smokers smoke have indicated that females are more likely than males to name factors such as relaxation and "to be sociable" (Table 10.1.5.7).

Table 10.1.5.7. Reasons given by smokers for smoking.

Nature of Any Difference	Postpubertal	
	Adolescent	Adult
Males more	**NORTH AMERICA** *United States*: Urberg & Robbins 1981* (way of coping)	
No signif. difference		**EUROPE** *France*: I Berlin et al. 2003:1580* (addiction, pleasure, habit)
Females more	**NORTH AMERICA** *United States*: Urberg & Robbins 1981* (sign of maturity & independence); S Clayton 1991 (self-confidence)	**EUROPE** *France*: I Berlin et al. 2003:1580* (tension reduction/relaxation, stimulation, social smoking)

10.1.5.8. Use of Nicotine Gum

The single study of the consumption of nicotine gum (used by some smokers to help quite smoking) concluded that males consume more than do females (Table 10.1.5.8).

Table 10.1.5.8. Use of nicotine gum.

Nature of Any Difference	Postpubertal
	Adult
Males more	**NORTH AMERICA** *United States*: Killen et al 1990 (smokers attempting to quit)
No signif. difference	
Females more	

10.1.5.9. Other Uses of Tobacco

The one available study indicated that males at least try smoke-less tobacco products more than do females (Table 10.1.5.9).

Table 10.1.5.9. Other uses of tobacco.

Nature of Any Difference	Multiple Age Categories
Males more	**NORTH AMERICA** *United States*: Cohen et al. 1987:1454 (grades 3 through 12)
No signif. difference	
Females more	

10.1.6. Ingesting Other Recreational (Often Illegal) Drugs

Many studies have been conducted on gender differences in the consumption of drugs for nontherapeutic purposes. The results of these studies are reviewed below.

10.1.6.1. Consuming Illegal Drugs (General/Nonspecific)

Nearly all studies that have sought to determine if a sex difference exists in the tendency to consume illegal drugs (usually based on anonymous self-reports) have concluded that males are more likely to have done so than females (Table 10.1.6.1).

Table 10.1.6.1. Consuming illegal drugs (general/nonspecific).

Nature of Any Difference	Postpubertal		Multiple Age Categories
	Adolescent	Adult	
Males more	**ASIA** *Russia*: Knyazev et al. 2004:833* **EUROPE** *Hungary*: Kecskes et al. 2002*; *Sweden*: Svensson 2003 **NORTH AMERICA** *United States*: Kandel et al. 1976a; Blackford 1977; Robbins 1989*; Fagan & Pabon 1990:331; Ingersoll et al. 1993:73; Khoury 1998:110; Bensley et al. 1999b; Dakof 2000	**ASIA** *Russia*: Knyazev et al. 2004:833* (young) **EUROPE** *Hungary*: Kecskes et al. 2002* **NORTH AMERICA** *United States*: Kessler et al. 1994a; CP Jackson & Matthews 1988 (college); Vega et al. 1998b (Mexican-Americans); JL Wong & Bessett 1999 (MMPI Scale); Tammemagi et al. 2004:600 (lung cancer patients) **OCEANIA** *Australia*: Lynskey et al. 1999	**EUROPE** *Italy*: Rezza et al. 1992 **NORTH AMERICA** *Canada*: Rootman & Richman 1975; De Wit et al. 1999:110; *United States*: RG Newman et al. 1974:58; CL Rich et al. 1988 (suicide victims); Robbins 1989*:117; Kandel 1991:394 (self-reports); Flannery et al. 1994 (R); AS Friedman et al. 1995 (African-Americans); AS Friedman et al. 1996 (African-Americans) **OCEANIA** *Australia*: MG Law et al. 2001
No signif. difference		**MIDDLE EAST** *Lebanon*: Karam et al. 2000:192 (college, stimulants)	**EUROPE** *Sweden*: Byqvist 1999
Females more			

10.1.6.2. Consuming Amphetamines

Investigations of gender differences in the consumption of amphetamines have not reached consistent conclusions (Table 10.1.6.2).

Table 10.1.6.2. Consuming amphetamines.

Nature of Any Difference	Postpubertal
	Adolescent
Males more	**NORTH AMERICA** *United States*: Fagan & Pabon 1990:331
No signif. difference	
Females more	**NORTH AMERICA** *United States*: Pascale & Evans 1993:113

10.1.6.3. Consuming Caffeine

Most caffeine consumption involves drinking coffee, although significant amounts of caffeine are also present in various soft drinks and most teas. Limited research suggests that males consume slightly more caffeine than do females or that no significant differences exist (Table 10.1.6.3).

Table 10.1.6.3. Consuming caffeine.

Nature of Any Difference	Postpubertal	
	Adolescent	Adult
Males more	**ASIA** *Japan*: Harada & Takeuchi 2001 (in beverages)	**NORTH AMERICA** *United States*: Karasik et al. 2003:311
No signif. difference		**NORTH AMERICA** *United States*: RL Phillips et al. 1980:302
Females more		

10.1.6.4. Consuming Cocaine

Sex differences in the consumption of cocaine have provided a mixed picture, both for humans and for rodents (Table 10.1.6.4). For humans, most studies suggest that males use the drug more than do females, but studies of rodents generally point in the opposite direction.

Table 10.1.6.4. Consuming cocaine.

Nature of Any Difference	Postpubertal		Multiple Age Categories
	Adolescent	Adult	
Males more		**NORTH AMERICA** *United States*: Substance Abuse & Mental Health Services Administration 2001 (present & past use)	**NORTH AMERICA** *United States*: Kosten et al. 1993; Greenblatt & Gfroerer 1998
No signif. difference	**EUROPE** *Spain*: Suris & Parera 2005:487	**MIDDLE EAST** *Lebanon*: Karam et al. 2000:192 (college) **NORTH AMERICA** *United States*: SM Evans et al. 1999 (cocaine smoking) **RODENT** *Rat*: WJ Lynch et al. 2000:135	**RODENT** *Rat*: DC Roberts et al. 1989; M Haney et al. 1995
Females more	**NORTH AMERICA** *United States*: Fagan & Pabon 1990:331	**RODENT** *Mouse*: AC Morse et al. 1993; *Rat*: DC Roberts et al. 1989; Lynch & Carroll 1999; UC Campbell et al. 2002 (meet criteria for self-administration with baclofen co-treatment); Carroll et al. 2002; Roth & Carroll 2004b	

10.1.6.5. Consuming Ecstasy

The one study of sex differences in the use of ecstasy (MDMA) concluded that no significant difference was apparent (Table 10.1.6.5).

Table 10.1.6.5. Consuming ecstasy.

Nature of Any Difference	Postpubertal
	Adolescent
Males more	
No signif. difference	**NORTH AMERICA** *United States*: CJ Boyd et al. 2003:211
Females more	

10.1.6.6. Consuming Inhalants

Two studies of adolescents found inhalants to be used more by males than by females (Table 10.1.6.6).

Table 10.1.6.6. Consuming inhalants.

Nature of Any Difference	Postpubertal
	Adolescent
Males more	**NORTH AMERICA** *United States*: Fagan & Pabon 1990:331; Pascale & Evans 1993:113
No signif. difference	
Females more	

10.1.6.7. Consuming Lysergic Acid Diethylamide (LSD)

As shown in Table 10.1.6.7, one study sought to determine which sex was more likely to have consumed the hallucinogen known as LSD. It concluded that males surpassed females in having consumed this drug.

Table 10.1.6.7. Consuming lysergic acid diethylamide (LSD).

Nature of Any Difference	Postpubertal
	Adolescent
Males more	**NORTH AMERICA** *Canada*: Popham 1970
No signif. difference	
Females more	

10.1.6.8. Consuming/Using Marijuana

The consumption of marijuana is substantial in most Western countries, especially in the 1960's. As shown in Table 10.1.6.8, most studies have found higher consumption rates among males than females, although a substantial number of exceptions are evident.

Table 10.1.6.8. Consuming/using marijuana.

Nature of Any Difference				Postpubertal	
				Adolescent	Adult
Males more				**AFRICA** *South Africa*: AJ Flisher et al. 2003:61 **NORTH AMERICA** *Canada*: Popham 1970; JR Baker & Yardley 2002:38; Miles et al. 2002 (twins); JM Wallace 2003; *United States*: Prendergast 1974; Currie et al. 1977; Wexler 1975 **OCEANIA** *Australia*: Levy & Pierce 1990	**AFRICA** *South Africa*: Peltzer et al. 2002:109 (college); Odek-Ogunde & Pande-Leak 1999 (college) **MIDDLE EAST** *Lebanon*: Karam et al. 2000:192 (college) **NORTH AMERICA** *Canada*: Boggs & Hughes 1973; G Fliksman et al. 1997 (college); *United States*: Roeloffs et al. 2001:1252 (depressed patients)
No signif. difference				**EUROPE** *Spain*: Suris & Parera 2005:487 **NORTH AMERICA** *United States*: Arnett & Jensen 1994*:9; Dolcini & Adler 1994:500; Grunbaum et al. 1998:155 (Whites)	**EUROPE** *Britain*: Surtees et al. 2002:26 (young) **NORTH AMERICA** *United States*: Bliss & Crown 1994:230 (young)
Females more				**EUROPE** *Denmark*: Arnett & Jensen 1994:9* **NORTH AMERICA** *United States*: D Fergusson et al. 1994b	

10.1.6.9. Consuming Methamphetamines

The one available study of methamphetamine came to the conclusion that this drug was more commonly consumed by males than by females (Table 10.1.6.9).

Table 10.1.6.9. Consuming methamphetamines.

Nature of Any Difference				Postpubertal	
				Adolescent	
Males more				**ASIA** *Thailand*: Sattah et al. 2002	
No signif. difference					
Females more					

10.1.6.10. Consuming Opiates

Most studies of opiate consumption have concluded that more males than females consume this drug (Table 10.1.6.10).

Table 10.1.6.10. Consuming opiates.

Nature of Any Difference				Postpubertal		Multiple Age Categories
				Adolescent	Adult	
Males more				**NORTH AMERICA** *United States*: Fagan & Pabon 1990:331 (heroin)	**EUROPE** *Britain*: Strang et al. 1997; *Norway*: Bretteville-Jensen 1999; Odegard & Bretteville-Jensen 2002 **NORTH AMERICA** *United States*: SJ Boyd et al. 2004:285 (heroin)	**ASIA** *Taiwan*: Chia et al. 2002 **EUROPE** *Britain*: S Major 1996 **NORTH AMERICA** *United States*: Burns et al. 1989; Macintyre & Jarvis 1995; RW Gear et al. 1996; RA Johnson & Gerstein 1998; Ready 1999
No signif. difference					**MIDDLE EAST** *Lebanon*: Karam et al. 2000:192 (college, morphine, heroin, codeine)	
Females more					**AFRICA** *South Africa*: Peltzer et al. 2002:109 (college, self report)	

10.1.6.11. Consuming Phencyclidine (PCP)

One study reported that males are more prone than females to consume phencyclidine (Table 10.1.6.11).

Table 10.1.6.11. Consuming phencyclidine (PCP).

Nature of Any Difference				Postpubertal	
				Adolescent	
Males more				**NORTH AMERICA** *United States*: Fagan & Pabon 1990:331	
No signif. difference					
Females more					

10.1.6.12. Overdosing on Recreational Drugs (Except as an Act of Suicide)

Drug overdosing refers to the consumption of drugs to the point of requiring hospitalization (usually in the form of an emergency room visit). Sometimes, even death results from drug overdosing. Table 10.1.6.12 shows that overdosing on recreational drugs – primarily opiates and cocaine – is more common among males than among females.

Table 10.1.6.12. Overdosing on recreational drugs (except as an act of suicide).

Nature of Any Difference					Postpubertal		Multiple Age Categories
						Adult	
Males more						**EUROPE** *Italy*: Preti et al. 2002 (death from overdose, young); *Spain*: de la Fuente et al. 1995 (death from overdose, young)	**EUROPE** *Spain*: Torralba et al. 1996 (death from overdose) **NORTH AMERICA** *United States*: KC Harlow 1990 (drug overdose, narcotics & cocaine); WK Bryant et al. 2004:849 (drug overdoe, heroin & methadone)
No signif. difference							
Females more							

10.2
ILLEGAL BEHAVIOR

Behavior that violates some criminal statute have been the focus of considerable research. Much of this research has sought to assess gender differences in the prevalence of law violating behavior.

10.2.1. Illegal Drug Use

Especially over the past century, legislatures and rulers of most countries have made the use and possession of various drugs illegal. These drugs typically include such mind-altering drugs as marijuana, heroin, and cocaine. Findings from research by criminologists and other social scientists regarding sex differences in the use of these drugs are reviewed in the following tables.

10.2.1.1. Self-Reported Illegal Drug Use/Possession/Sale

As Table 10.2.1.1 shows, most studies have found that a greater proportion of males than females self-report the use, possession, and/or sale of illegal drugs in general.

Table 10.2.1.1. Self-reported illegal drug use/possession/sale.

Nature of Any Difference					Postpubertal		Multiple Age Categories
					Adolescent	Adult	
Males more involved					**EUROPE** *Belgium*: Born & Gavray 1994:140; *Britain*: Evans et al. 1974; *Germany*: Sutterer & Karger 1994:165; *Greece*: Spinellis et al. 1994:301; *Italy*: Gatti et al. 1994:273; *Netherlands*: Sandwijk et al. 1995; Abraham 1999:576; *Spain*: Barberet et al. 1994:247; *Switzerland*: Killias et al. 1994:195 **NORTH AMERICA** *Canada***:** Smart et al. 1970; Annis et al. 1971; Fejer 1971; Fejer et al. 1972; Bakal et al. 1975; Forslund 1977; Hollander & Macurdy 1978; *United States*: Frumkin et al. 1969; Gosset et al. 1971; Hager et al. 1971; Boggs & Hughes 1973; Milman & Su 1973; Galli & Stone 1975; Currie et al. 1977; Killen 1977; Gleaton & Smith 1981; Winfree et al. 1981; Fors & Rojeck 1983:216; Barnes & Welte 1986; Newcomb et al. 1987:424; Simons et al. 1991:658; VJ Peters et al. 1992; Ingersoll et al. 1993:73; Gfellner & Hundleby 1994; Opland et al. 1995; Gottfredson & Koper 1996; Johanson et al. 1996; Liu & Kaplan 1996; Nagel et al. 1996:292; Zebrowski & Gregory 1996; Wadsworth et al. 1997:567; Whitmore et al. 1997:92; JM Wallace 2003 **OCEANIA** *Australia*: Levy & Pierce 1990		**NORTH AMERICA** *Canada***:** Laforest 1969; *United States*: Harrell & Cisin 1980; Peters et al. 1992 **OCEANIA** *Australia*: McAllister & Makkai 1991
No signif. difference					**EUROPE** *Estonia*: Merenakk et al. 2003:1509; *Germany*: Boers et al. 1994:352; *Norway*: Storvoll & Wichstrom 2002:189* **NORTH AMERICA** *Canada*: Moyer & Fejer 1972; *United States*: Wechsler & Thum 1973; Prendergast 1974; Wexler 1975; Forslund 1977; Johnston et al. 1985; Agnew & White 1992:486; Arnett & Jensen 1994; Gfellner & Hundleby 1994; Marshall & Webb 1994:332; Winfree et al. 1994:163; Mieczkowski 1996:382	**NORTH AMERICA** *United States*: Diala et al. 2004	
Females more involved					**AFRICA** *South Africa*: Peltzer et al. 2002:109 (college) **EUROPE** *Finland*: Aromaa 1994:27 **NORTH AMERICA** *United States*: Donnermeyer et al. 1987; Stevens et al. 2004 (use)		

10.2.1.2. Officially Recorded Illegal Drug Use/Possession/Sale

As Table 10.2.1.2 shows, males are more likely than females to have been arrested or convicted of illegal drug use.

Table 10.2.1.2. Officially recorded illegal drug use/possession/sale.

Nature of Any Difference					Postpubertal		Multiple Age Categories
					Adolescent	Adult	
Males more					**ASIA** *China*: B Wu 1996:238 **NORTH AMERICA** *United States*: Wechsler & McFadden 1976; Bainbridge & Crutchfield 1983:259	**NORTH AMERICA** *United States*: LD Harrison & Gfroerer 1992; Nunes-Dinis & Weisner 1997	**ASIA** *Taiwan*: Denq et al. 1996:357 **MIDDLE EAST** *Jordan*: S Weiss et al. 1999:192 **NORTH AMERICA** *United States*: Strimbu et al. 1973 **OCEANIA** *New Zealand*: Ritchie & Ritchie 1983:331
No signif. difference							
Females more							

10.2.1.3. Age of Onset of Illegal Drug Use

The research summarized in Table 10.2.1.3 indicates that males begin their illegal drug use at a younger age than do females.

Table 10.2.1.3. Age of onset of illegal drug use.

Nature of Any Difference	Citations
Males earlier	**NORTH AMERICA** *United States*: Kosten et al. 1985; KA White et al. 1996; Khoury 1998:122; Anglin et al. 1987 (among drug addicts); Cohen et al. 1987:1454; Hser et al. 1987c (among drug addicts); AL Haas & Peters 2000
No signif. difference	
Females earlier	

10.2.1.4. Driving While Drunk or High

According to several studies, males are more likely than females to drive while drunk or high on alcohol or other drugs (Table 10.2.1.4).

Table 10.2.1.4. Driving while drunk or high.

Nature of Any Difference		Postpubertal		Multiple Age Categories
			Adult	
More in males			**NORTH AMERICA** *United States*: Cosper & Mozersky 1968 (self report); GB West et al. 1996 (college)	**EUROPE** *Finland*: Makela & Mustonen 2000; *Germany*: Bischof et al. 2000 (elderly, drunk) **NORTH AMERICA** *United States*: Clay & Swenson 1978 (arrests); Soderstrom et al. 1984 (auto crashes); National Highway Traffic Safety Administration 1996 (alcohol related crashes); Bergdahl 1999 (drunk); Marelich et al. 2000 (self report)
No signif. difference				
More in females				

10.2.2. Engaging in Crime and Delinquency

Below are summarized findings that have to do with sex differences in crime and delinquency in general or specifically excluding strictly drug-related and sex-related offenses.

10.2.2.1. Self-Reported Offending in General

Presented in Table 10.2.2.1 is a summary of a large number of studies of self-reported criminal or delinquent offending without regard to the specific type. As one can see, there is an overwhelming tendency for offending in general to be more common among males than among females.

Table 10.2.2.1. Self-reported offending in general.

Nature of Any Difference					Postpubertal		Multiple Age Categories
					Adolescent	Adult	
Males higher					**ASIA** *China*: Lau & Leung 1992 **EUROPE** *Belgium*: Born & Gavray 1994:140; *Britain*: Riley & Shaw 1985; Bowling et al. 1994:51; Newcombe et al. 1995:333; Palmer & Hollin 1996; *Finland*: Aromaa 1994:27; *France*: Hartjen & Priyadarsini 2003 (rural); *Germany*: Boers et al. 1994:352; Sutterer & Karger 1994:165; *Greece*: Spinellis et al. 1994:301; *Ireland*: McQuoid 1994:72; *Italy*: Gatti et al. 1994:273; *Netherlands*: Terlouw & Bruinsma 1994:109; *Spain*: Barberet et al. 1994:273; van der Ende & Verhulst 2005:123 (self and parental report); *Switzerland*: Killias et al. 1994:195 **MIDDLE EAST** *India*: Hartijen & Priyadarsini 1984; Hartjen & Kethineni 1993:46 **NORTH AMERICA** *Canada*: Paetsch & Bertrand 1997:30; *United States*: Gold 1966:46; Voss 1966; Hirschi 1969; Hindelang 1971:526; Datesman et al. 1975; M Gold & Reimer 1975; Kratcoski & Kratcoski 1975; Jensen & Eve 1976; Killeen 1977; Cernkovich & Giordano 1979; Cullen et al. 1979:306; RE Johnson 1979; Steffensmeier & Steffensmeier 1980; Canter 1982b; Wilkinson et al. 1982:228; Bainbridge & Crutchfield 1983; Elliott et al. 1983; Hagan et al. 1985; Elliott et al. 1986:486; R Johnson 1986:69; Morash 1986; Cernkovich & Giordano 1987:306; Simons et al. 1991:658; Ingersoll et al. 1993:73; Elliott 1994:6; Marshall & Webb 1994:332; DC Rowe & Flannery 1994; DC Rowe et al. 1995; TD Evans et al. 1996; Johanson et al. 1996; Saner & Ellickson 1996; RA Johnson et al. 1997; Mears et al. 1998; Weiler 1999; Burrow et al. 2004:277 (adoptees); CP Flynn 2002:141; TF Locke & Newcomb 2003:55; RX Liu 2004 (school delinquency) **OCEANIA** *Australia*: Rigby et al. 1989; Heaven 1996:748; Rigby & Cox 1996; *Hawaii*: Voss 1963:326; *New Zealand*: Moffitt & Silva 1988b; Moffitt et al. 1994:361; Moffitt et al. 2001:35; DM Fergusson et al. 2002:166 (violent & property offenses) **INTERNATIONAL** *Multiple Countries*: Junger-Tas et al. 1994	**NORTH AMERICA** *United States*: Wallerstein & Wyle 1947; DA Smith & Visher 1980 (young)	**EUROPE** *Iceland*: Olafsdottir 1985:29; *Sweden*: Elmhorn 1965 **NORTH AMERICA** *Canada*: LeBlanc 1986; *United States*: Hindelang et al. 1981; McGarrell & Flanagan 1985:Tbl 3.48
No signif. difference					**NORTH AMERICA** *United States*: Agnew & White 1992:486; Winfree et al. 1994:163		
Female higher					**NORTH AMERICA** *United States*: Donnermeyer et al. 1987		

10.2.2.2. Self-Reported Violent Offending

Most of the research on self-reported violent offending has concluded that males are more involved in these types of crimes than females (Table 10.2.2.2).

Table 10.2.2.2. Self-reported violent offending.

Nature of Any Difference					Postpubertal		Multiple Age Categories
					Adolescent	Adult	
Males more						**NORTH AMERICA** *United States*: Felson 2002	**NORTH AMERICA** *United States*: J Swanson et al. 1990; Baumer 2002 **OCEANIA** *New Zealand*: TE Moffitt et al. 2001:86
No signif. difference					**NORTH AMERICA** *United States*: Fehon et al. 2001 (psychiatric patients)		
Females more							

10.2.2.3. Self-Reported Property Offending

All of the available research based on self-reports is consistent in indicating that males are more likely than females to engage in property offenses (Table 10.2.2.3).

Table 10.2.2.3. Self-reported property offending.

Nature of Any Difference					Postpubertal		Multiple Age Categories
					Adolescent	Adult	
Males more					**NORTH AMERICA** *United States*: Riddle 1927; Hindelang et al. 1979; Chadwick & Top 1993:62	**AFRICA** *South Africa*: Lochner et al. 2004 (pyromania, OCD patients) **EUROPE** *Britain*: Box & Hale 1984; *Denmark*: LA Baker et al. 1989:358 **NORTH AMERICA** *Canada*: Tepperman 1977; Hartnagel 1987:77; Boritch & Hagan 1990:578 (19th Century); *United States*: Parmelee 1926:240; Simon 1979; Steffensmeier 1978; Steffensmeier 1980; Wilson & Herrnstein 1985:108; RF Marcus 1999 (burglary) **INTERNATIONAL** *Several Preindustrial Countries*: Bacon et al. 1963:292	**NORTH AMERICA** *United States*: Healy & Bronner 1926:278; Steffensmeier & Cobb 1981 **OCEANIA** *New Zealand*: Ritchie & Ritchie 1983:330; TE Moffitt et al. 2001:86
No signif. difference							
Females more							

10.2.2.4. Officially Reported Offending in General

Official crime and delinquency data are nearly unanimous in indicating that males are more likely to offend than females (Table 10.2.2.4).

Table 10.2.2.4. Officially reported offending in general.

Nature of Any Difference	Postpubertal		Multiple Age Categories
	Adolescent	Adult	
Males more	**ASIA** *Taiwan*: Chow 1964:27; *Soviet Union*: Connor 1970:286 **EUROPE** *Britain*: Healy & Bronner 1926 (official data); Mulligan et al. 1963; Cockburn & Maclay 1965; Schofield 1965:149; JW Douglas et al., 1966; Palmai et al. 1967:1075; A Edwards 1973; CK Miller et al. 1974; Wadsworth 1979:103; Ouston 1984; Farrington 1987a:47; *Finland*: Figueira-McDonough 1986; West et al. 1990; *Finland*: Almqvist 1986:296; Rantakallio et al. 1995:115; *Norway*: Pedersen & Wichstrom 1995:554; *Poland*: Hersch 1937:865; *Spain*: Diaz 1984:312; *Sweden*: Elmhorn 1965:38; Sigvardsson et al. 1982; Magnusson 1988 **LATIN AMERICA** *Argentina*: DeFleur 1970:131 **MIDDLE EAST** *India*: Hartjen & Kethineni 1993:71 **NORTH AMERICA** *Canada*: Hagen et al. 1979; Linden & Fillmore 1981; McCarthy & Hagan 1987; *United States*: Ackerson 1931; Fortes 1933 (official data); Maller 1933 (official data); Alper & Lodgen 1936 (official data); Roach 1937; Maller 1937a; Radzinowicz 1937:91; Children's Bureau 1946a; Porterfield 1946; Schwartz 1949:12; Wattenberg & Saunders 1954; Gibbons & Griswold 1957; Mensh et al. 1959; Eaton & Polk 1961:19; Ball 1962; Barker & Adams 1962; Havighurst et al. 1962:69; Hathaway & Monchesi 1963; Lunden 1964:68; Ball et al. 1965; Wise 1967; Gordon 1973; Robins 1975:129; Jensen & Eve 1976; Vinter et al. 1976:23; Hamparian et al. 1978; Tagaki & Platt 1978:14; Warren 1979; Kashani et al. 1980; Steffensmeier & Steffensmeier 1980; Wilkinson 1980:27; Feyerherm 1981; Giallombardo 1982:46; Shannon 1982; Bainbridge & Crutchfield 1983:261; Roff & Wirt 1984; Tracy et al. 1985:6; Wilson & Herrnstein 1985:106; White et al. 1985:191; LeFlore 1988:637; Rhodes & Fischer 1993; Shelden & Chesney-Lind 1993:84; DC Rowe et al. 1995; Pakiz et al. 1997; RF Marcus 1999; Silverthorne & Frick 1999; Grella et al. 2001 (among drug addicts) **OCEANIA** *Hawaii*: Voss 1963:323; Werner 1987:22; Werner & Smith 1992:103; *Samoa*: Freeman 1983; *New Zealand*: TE Moffitt et al. 2001:32*	**EUROPE** *Britain*: Shaw 1966:148; Gatrell & Hadden 1972:389 (19th century); Beattie 1975 (18th century); Weiner 1975 (17th century); *France*: Zehr 1975* (18th century); *Germany*: Zehr 1975* (18th century); *Sweden*: Wikstrom 1991:71; *Several European Countries*: Quetelet 1842/1969 (18th century); Lombroso 1911:181 (19th century) **MIDDLE EAST** *India*: Bhanot & Mishra 1978; Simon & Sharma 1979:104 & 394; Nagla 1982 **NORTH AMERICA** *United States*: Gillin 1926:57; Parmelee 1926:240; Kavanagh 1928:147; Gillin 1935:48; Pollack 1950; East 1951:281; Noblit & Burcart 1976; Wilson & Herrnstein 1985:106 **INTERNATIONAL** *Several Industrial Countries*: Bonger 1916 (19th century); Hurwitz & Christiansen 1983:260	**AFRICA** *Ghana*: Seidman & Eyison 1969:63; *Several African Countries*: Houchon 1967; Clifford 1969:240; Leslie 1969:170 **ASIA** *Japan*: Ogawa 1976:601; *Soviet Union*: Koerber 1935:5; Serio 1992b:10 **EUROPE** *Britain*: Mannheim 1965:678; Farrington 1981; *Germany*: Wurtenberger & Koch 1976:479; *Hungary*: Hacker 1949; *Iceland*: Olafsdottir 1985:29; *Italy*: Giannini 1976:548; *Sweden*: Wikstrom 1990:77 **LATIN AMERICA** *Argentina*: Blarduni 1976:154; *Venezuela*: Mayorca 1976 **NORTH AMERICA** *Canada*: Szabo & Rico 1976:309; *United States*: Healy & Bronner 1926:255; Radzinowicz 1937; Reckless 1967:98; Green 1970:480; Schafer 1976:102; Weiss 1976; Norland & Shover 1977:21; Hindelang 1980; Hindelang 1981; Shannon 1981; Warr 1982:196; Stein et al. 1987 (drug use); Steffensmeier & Allan 1988; Steffensmeier & Streifel 1991; RM O'Brien et al. 1999; Stolzenberg & D'Alessio 2004 (arrested) **OCEANIA** *Australia*: O'Brien 1970:286; *New Zealand*: TE Moffit et al. 2001:83* **INTERNATIONAL** *Several Industrial Countries*: Goppinger 1973:361; Simon & Sharma 1979:104 & 394
No signif. difference	**EUROPE** *Finland*: Aromaa 1994:27		
Females more	**NORTH AMERICA** *United States*: Weiler 1999 (excluding violent crimes)		

10.2.2.5. Officially Reported Violent Offending

A very large number of studies have been published regarding gender differences in the commission of violent crime based on official statistics (as opposed to self-reports). These studies have involved the collection of data from a wide diversity of countries, some of which extend back in time as many as two or three centuries.

As one can see in Table 10.2.2.5, the studies have concluded without exception that males are more likely to commit such offenses than are females, with two exceptions: one study of violent acts by children found no significant difference, and one study of infanticide indicated that female offenders surpassed male offenders of this crime.

Table 10.2.2.5. Officially reported violent offending.

Nature of Any Difference	Prepubertal				Postpubertal		Multiple Age Categories
				Childhood	Adolescent	Adult	
Males more involved					**AFRICA** *Nigeria*: Asuni 1963 **ASIA** *Japan*: Tamura 1980 (murder) **EUROPE** *Britain*: Beattie 1986* (17th & 18th centuries); J Warner et al. 2005* (17th & 18th centuries) **NORTH AMERICA** *Canada*: Tremblay 2004*; *United States*: R Anderson et al. 1983* (child abuse, more injurious); Daly & Wilson 1994* (child abuse, more injurious); Holinger et al. 1994 (murder); Starling et al. 1995* (child abuse, more injurious); Loeber & Stouthamer-Leober 1998	**EUROPE** *Britain*: Beattie 1986* (17th & 18th centuries); J Warner et al. 2005* (17th & 18th centuries) **NORTH AMERICA** *Canada*: Tremblay 2004* (young); *United States*: BK Anderson et al. 1983* (child abuse, more injurious); M Daly & Wilson 1988 (familial homicide); Browne & Williams 1989 (homicide); M Maxfield 1989 (homicide); Yang & Lester 1992 (married persons, homicide); Daly & Wilson 1994* (child abuse, more injurious); Kruttschmitt 1994; Starling et al. 1995* (child abuse, more injurious); Almgren et al. 1998; R Felson & Messner 1998 (familial and intimate homicide); DJ Steffensmeier & Allan 1998; Greenfield & Snell 1999; Vollum & Titterington 2001	**AFRICA** *Congo*: Southall 1960:217* (Alur tribe, murder); *Egypt*: Okasha et al. 1975:34 (murder); Asuni 1969 (murder) **EUROPE** *Britain*: d'Orban 1990; Gibson & Klein 1961 (murder); Givern 1977 (murder in the 13th century); *Finland*: Verkko 1951 (murder); Viemero 1996:94; *Germany*: Goppinger 1983:365; Groebel 1983:80; *Iceland*: Gudjonsson & Petursson 1982 (murder); *Scotland*: Gillies 1976 (murder); *Sweden*: Gottlieb et al. 1987 (murder); von Hofer 1990:31 (18th-20th century murder) **LATIN AMERICA** *Brazil*: Yearwood 1974 (murder) **MIDDLE EAST** *India*: Elwin 1950 (murder); Saran 1974 (murder); Varma 1978 (murder); *Israel*: Landau et al. 1974 (murder) **NORTH AMERICA** *Canada*: Hartnagel 1987:77; Boritch & Hagan 1990:575 (19th century); Maxim & Keane 1992 (murder); Moyer 1992:398 (murder); Gartner 1995:200 (murder); *United States*: Wolfgang 1958:31; Voss & Hepburn 1968:501; Pokorny 1965; Wolfgang 1967:18; Boelkins & Heiser 1970:31; Block & Zimring 1973 (homicide); Detre et al. 1975; Block 1977; Curtis 1977:164; Swigert & Farrell 1977:21; Simon & Sharma 1979; Steffensmeier 1980; Hindelang 1981:466; Steffensmeier & Cobb 1981; Tinkenberg & Ochberg 1981; Bainbridge & Crutchfield 1983:261; AE Daniel & Kashani 1983 (official data); Weiner & Wolfgang 1985:27; Wilson & Herrnstein 1985:108; Monkonon 1989:92 (19th century); Jurik & Winn 1990; Sommers & Baskin 1992:193; Zingraff et al. 1993:192; RJ Sampson & Lauritsen 1994; Bachman & Saltzman 1995; Langley et al. 1997; McKanna 1997:42 (19th century); Nunes-Dinis & Weisner 1997; JF Short 1997:8; Tjaden & Thoennes 1998; R O'Brien et al. 1999 (homicide); M Zahn & McCall 1999 (homicide); Belknap 2001; DJ Steffensmeier & Broidy 2001; Baumer 2002:594; JA Fox & Piquero 2003 (homicide); Batton 2004:441 (homicide) **OCEANIA** *Australia*: Wallace 1986; *New Zealand*: Ritchie & Ritchie 1983:330 **INTERNATIONAL** *Various Preliterate Societies*: Bohannan 1960a:36; Bohannan 1960c:240; JH Beattie 1960:134; Fallers & Fallers 1960:76; Southall 1960:217*; La Fontaine 1960:106; *Various Preindustrial Countries*: Bacon et al. 1963:292; Verkko 1967:42; Curtis 1974:160; Curtis 1977:164; Konner 1982:274; Daly & Wilson 1990 (murder)
No signif. difference				**NORTH AMERICA** *Canada*: Tremblay 2004*			
Females more involved						**INTERNATIONAL** *Various Hunter-Gatherers*: RL Kelly 1995:233 (infanticide)	

10.2.2.6. Officially Reported Property Offending

The studies summarized in Table 10.2.2.6 pertain to gender differences in the commission of property offenses (based on official statistics). It reveals that nearly all studies have concluded that males surpass females in the commission of these offenses.

Table 10.2.2.6. Officially reported property offending.

Nature of Any Difference	Prepubertal				Postpubertal		Multiple Age Categories
				Childhood	Adolescent	Adult	
Males more					**EUROPE** *Denmark*: Arnett & Jensen 1994:10*; *Norway*: Storvoll & Wichstrom 2002:189*(self-report, theft & vandalism) **NORTH AMERICA** *Canada*: Tremblay 2004* (theft); *United States*: J Rhodes & K Fischer 1993; Arnett & Jensen 1994:10*; D Fergusson et al. 1994b; RF Marcus 1999 (purse snatching & minor theft)	**NORTH AMERICA** *Canada*: Tremblay 2004* (young, theft)	**EUROPE** *Britain*: Box & Hale 1984; *Denmark*: LA Baker et al. 1989:358 **NORTH AMERICA** *Canada*: Tepperman 1977; Hartnagel 1987:77; Boritch & Hagan 1990:578 (19th century); *United States*: Healy & Bronner 1926:278; Parmelee 1926:240; Riddle 1927; Hindelang et al. 1979; Simon & Sharma 1979; Steffensmeier 1978; Steffensmeier 1980; Steffensmeier & Cobb 1981; Chadwick & Top 1993:62 **OCEANIA** *New Zealand*: Ritchie & Ritchie 1983:330 **INTERNATIONAL** *Several Preindustrial Countries*: Bacon et al. 1963:292
No signif. difference				**NORTH AMERICA** *Canada*: Tremblay 2004*			
Females more							**NORTH AMERICA** *United States*: Goldman 1991:988 (kleptomania)

10.2.2.7. Carrying Weapons

All of the available evidence indicates that the carrying of weapons is more common among males than among females (Table 10.2.2.7).

Table 10.2.2.7. Carrying weapons.

Nature of Any Difference	Postpubertal		Childhood
	Adolescent	Adult	
Males more	**EUROPE** *Norway*: Rossow et al. 1999 (in school); *Scotland*: McKeganey & Norrie 2000 (in school); *Switzerland*: Klingemann 2001 (in school); Kuntsche & Klingemann 2004 (in school) **NORTH AMERICA** *United States*: Valois et al. 1995 (in school); SL Bailey et al. 1997 (in school); Grunbaum et al. 1998 (in school); Kulig et al. 1998 (in school); Valois et al. 1998 (in school)	**NORTH AMERICA** *United States*: Presley et al. 1997 (college, in school)	**NORTH AMERICA** *United States*: Arria et al. 1995 (urban, lethal weapons, knife or gun)
No signif. difference			
Females more			

10.2.2.8. Criminal Recidivism

The concept of criminal recidivism has to do with re-offending after an initial offense. It is usually assessed in terms of being rearrested within a few years following a prior conviction. In some cases, minor types of offenses (such as speeding and shoplifting) are counted as recidivism, while other times only new felonies are counted. Studies of criminal recidivism have generally concluded that male offenders exhibit higher rates, although a few studies have failed to find any significant difference between the sexes (Table 10.2.2.8).

Table 10.2.2.8. Criminal recidivism.

Nature of Any Difference	Postpubertal	
		Adult
Males recidivate more		**ASIA** *Japan*: Ogawa 1976:601 **EUROPE** *Italy*: Giannini 1976:548 **NORTH AMERICA** *United States*: Unkovic & Ducsay 1969; Meade 1973; LD Brown 1978:98; Brundage 1984; MD Jacobs 1990; Minor et al. 1997:337; Fendrich & Archer 1998; Benda et al. 2001:95 (young); Benda 2005 (graduates of a boot camp) **OCEANIA** *Australia*: Broadhurst et al. 1988; Broadhurst & Maller 1990
No signif. difference		**NORTH AMERICA** *United States*: Thomas 1977:61; Schmidt & White 1979; SD Gottfredson & DM Gottfredson 1979; Carroll et al. 1982; Roundtree et al. 1984; Stevens et al. 2004 (substance abuse treatment)
Females recidivate more		

10.2.2.9. Traffic Violations/Reckless Driving

Traffic violations include such offenses as reckless driving, exceeding speed limits, and driving while intoxicated. Table 10.2.2.9 reveals that males are more likely than females to commit these offenses, except possibly in the case of disobeying stop signals.

Table 10.2.2.9. Traffic violations/reckless driving.

Nature of Any Dif-ference	Postpubertal		Multiple Age Categories
	Adolescent	Adult	
Males more	**EUROPE** *Britain*: E Forsyth 1992 (reckless driving); *Denmark*: Arnett & Jensen 1994* (reckless driving) **NORTH AMERICA** *Canada*: J Rothe 1987 (reckless driving); *United States*: Ebbesen & M Haney 1973 (reckless driving); R Hagen 1975 (reckless driving); L Evans & Wasielewski 1983 (reckless driving); Wasielewski 1984 (reckless driving); D Elliot 1987 (reckless driving); L Evans 1991 (reckless driving); Arnett & Jensen 1994* (reckless driving)	**NORTH AMERICA** *United States*: Sagatun 1989 (young)	**NORTH AMERICA** *United States*: DM Harrington & McBride 1970 (controlled for miles driven); Koehler & Willis 1994
No signif. difference			**NORTH AMERICA** *United States*: Retting & William 1996 (disobeying stop signs/lights)
Females more			

10.2.3. Sex (or Sex-Related) Violent Behavior

Sex or sex-related offenses are those in which at least a major apparent motive of the offending behavior is of a sexual nature.

10.2.3.1. Sexual Aggression

Most relevant studies have concluded that males are more sexually aggressive than females (Table 10.2.3.1).

Table 10.2.3.1. Sexual aggression.

Nature of Any Dif-ference	Postpubertal		Multiple Age Categories
	Adolescent	Adult	
Males more	**NORTH AMERICA** *United States*: Feltey et al. 1991; Bergman 1992 (among dating couples); Foshee 1996 (among rural dating couples)	**NORTH AMERICA** *United States*: Sigelman et al. 1984 (young, sexual coercion); Pirog-Good & Stets 1989 (young); KM Ryan 1998:384* (young)	**NORTH AMERICA** *United States*: K Lane & Gwartney-Gibbs 1985 (among dating couples); Makepeace 1986 (among dating couples)
No signif. difference		**NORTH AMERICA** *United States*: Hogben & Waterman 2000 (college)	
Females more			

10.2.3.2. Engaging in Courtship Violence (Intimate Partner Violence)

Considerable research has been undertaken since the 1980s on sex differences in courtship violence. Split-Table 10.2.3.2a suggests that among adolescents, there is no consistent pattern with respect to which gender is most likely to perpetrate courtship violence.

Split-Table 10.2.3.2a. Engaging in courtship violence (intimate partner violence) (adolescents).

Nature of Any Dif-ference	Postpubertal
	Adolescent
Males more	**AFRICA** *South Africa*: Swart et al. 2002:389* (violent to point of causing injury, dating) **NORTH AMERICA** *United States*: Feiring et al. 2002*
No signif. difference	**NORTH AMERICA** *United States*: O'Keefe et al. 1986 (dating couples); O'Keefe & Treister 1998
Females more	**AFRICA** *South Africa*: Swart et al. 2002:389* (dating) **NORTH AMERICA** *United States*: Feiring et al. 2002*; Foshee 1996 (rural dating couples); Capaldi & Crosby 1997; Malik et al. 1997; O'Keefe 1997; Schwartz et al. 1997; Chase et al. 1998; Wekerle & Wolfe 1999

Turning to research involving adults, all of the findings suggest that there is either no significant sex difference or that females surpass males in the commission of courtship violence (Split-Table 10.2.3.2b).

Split-Table 10.2.3.2b. Engaging in courtship violence (intimate partner violence) (adults).

Nature of Any Difference					Postpubertal		Multiple Age Categories
						Adult	
Males more							
No signif. difference						**NORTH AMERICA** *United States*: Henton et al. 1983* (college, dating couples); Sigelman et al. 1984 (college, dating couples); Rouse et al. 1988 (college, dating couples); JW White & Koss 1991 (college, dating couples); Follette 1992; J Katz et al. 2002 (college)	**NORTH AMERICA** *United States*: Cate et al. 1982 (dating couples); Laner & Thompson 1982 (dating couples); Deal & Wampler 1986* (dating couples); Makepeace 1986* (dating couples); P Burke et al. 1988 (dating couples); Arias & Johnson 1989 (dating couples); L Marshall & Rose 1990 (dating couples)
Females more						**NORTH AMERICA** *United States*: Henton et al. 1983* (young); Straus et al. 1980; Plass & Gessner 1983 (college, dating couples); K Lane & Gwartney-Gibbs 1985 (dating couples); Deal & Wampler 1986* (young); Makepeace 1986* (college, self-defense); Straus & Gelles 1986; Arias et al. 1987*; Marshall & Rose 1987; M Clark et al. 1994 (college, African-Americans); Fagan & Browne 1994 (young); Magdol et al. 1997 (young) **OCEANIA** *New Zealand*: Magdol et al. 1997	**NORTH AMERICA** *United States*: Arias et al. 1987* (dating couples); DeMaris 1987 (dating couples)

10.2.3.3. Engaging in Domestic Violence (Spouse Abuse) in General

According to the available research, there are no consistent gender differences regarding domestic violence (Table 9.6.1.10).

Table 10.2.3.3. Engaging in domestic violence (spouse abuse) in general.

Nature of Any Difference					Postpubertal		Multiple Age Categories
						Adult	
Males more						**EUROPE** *Britain*: R Chester & Streather 1972 **NORTH AMERICA** *Canada*: Byles 1978; *United States*: JE O'Brien 1971; D Martin 1976; Dobash & Dobash 1978; Stark et al. 1979; Bachman & Saltzman 1995 (physical); Tjaden & Thoennes 1998*(physical); Zlotnick et al. 1998 (physical)	**NORTH AMERICA** *United States*: Perkins & Klaus 1996 **OCEANIA** *Australia*: Queensland Domestic Violence Task Force 1988
No signif. difference						**EUROPE** *Britain*: K Graham et al. 2004:389* (reported by females) **NORTH AMERICA** *United States*: Yllo & Straus 1991 (cohabitating couples, intersex violence); Mc Farlane et al. 2000 (severity of intimate partner violence)	**NORTH AMERICA** *United States*: M Straus et al. 1974; Straus et al. 1980; Straus & Gelles 1986; McNeely & Robinson-Simpson 1987; O'Leary et al. 1989; MA Straus & Gelles 1990 (intersex violence); Pan et al. 1994
Females more						**EUROPE** *Britain*: K Graham et al. 2004:389* (slapped domestic partner) **NORTH AMERICA** *United States*: Straus et al. 1980 (violence toward partner); ML Bernard & Bernard 1983 (within the family generally); Straus & Gelles 1986 (violence toward partner); Rouse et al. 1988; McNeely & Mann 1990; Stets & Straus 1990 (seriously injured by domestic partner abuse); Vivian & Langhinrichen-Rohling 1994 (seriously injured by domestic partner abuse); Tjaden & Thoennes 1998* (frequently abusive); Archer 2000 (violence towards partner)	**NORTH AMERICA** *United States*: Magdol et al. 1997

10.2.3.4. Domestic Violence (Spouse Abuse) Without Serious Injury to Victim (or in General)

The studies pertaining to Table 10.2.3.4 have to do with relatively minor forms of domestic violence (i.e., one in which no serious injuries were involved). It suggests there is no consistent gender difference.

Table 10.2.3.4. Domestic violence (spouse abuse) without serious injury to victim.

Nature of Any Difference					Postpubertal		Multiple Age Categories
						Adult	
Males more							
No signif. difference						**NORTH AMERICA** *United States*: Caetano et al. 2005* (intact couples)	**NORTH AMERICA** *United States*: SB Sorenson et al. 1996:38
Females more						**NORTH AMERICA** *United States*: Caetano et al. 2005* (female-to-male violence more likely to re-occur)	

10.2.3.5. Domestic Violence (Spouse Abuse) With Serious Injury or Death to Victim

Studies of domestic violence in which serious injury or death was the outcome have all concluded that males are more often the perpetrator than females (Table 10.2.3.5).

Table 10.2.3.5. Domestic violence (spouse abuse) with serious injury or death to victim.

Nature of Any Difference	Postadolescent		
		Adult	
Males more		**NORTH AMERICA** *United States*: Stets & Straus 1990; Cantos et al. 1994; Vivian & Langhinrichsen-Rohling 1994; Morse 1995; Tjaden & Thoennes 1998; Greenfield & Snell 1999; J Archer 2000	
No signif. difference			
Females more			

10.2.3.6. Officially Reported Commission of Rape

Data maintained by the criminal justice system have consistently shown that males are more likely than females to commit rape (Table 10.2.3.6).

Table 10.2.3.6. Officially reported commission of rape.

Nature of Any Difference							Multiple Age Categories
More male perpetrators							**NORTH AMERICA** *United States*: National Council on Crime and Delinquency 1976 (parolees); Groth & Burgess 1980:806 (reports to police); DE Russell 1984:67 (arrests)
No signif. difference							
More female perpetrators							

10.2.3.7. Perpetrator or Victim Reported Rape/Sexual Assault

All of the available research based on reports from perpetrators and victims indicates that males are more likely than females to commit rape (Table 10.2.3.7).

Table 10.2.3.7. Perpetrator or victim reported rape/sexual assault.

Nature of Any Difference					Postpubertal		Multiple Age Categories
					Adolescent	Adult	
More male perpetrators					**NORTH AMERICA** *United States*: Hall & Flannery 1984 (victim-report)	**NORTH AMERICA** *United States*: Lott et al. 1982:312 (self-report); Sigelman et al. 1984:538 (college, self-report); Calderwood 1987:53 (victim-report); Anonymous 1989 (victim-report); L Ellis et al. 1990:1210 (college, victim-report)	**NORTH AMERICA** *United States*: Groth & Burgess 1980:806 (victim calls to rape crisis center); Kaufman et al. 1980 (victim call to rape crisis center); U.S. Department of Justice 1989:297 (victim-report); Frazier 1993 (victim visits to hospital emergency room); Laumann et al. 1994:335
No signif. difference							
More female perpetrators							

10.2.3.8. Incestuous Sexual Behavior

The one study of sex differences in incestuous behavior involved macaques. It indicated that males were more likely than females to make sexual overtures toward close relatives of the opposite sex (Table 10.2.3.8).

Table 10.2.3.8. Incestuous sexual behavior.

Nature of Any Difference							Multiple Age Categories
Males more							**PRIMATE (EXCEPT APE)** *Japanese Macaque*: J Soltis et al. 1993 (initiated behavior)
No signif. difference							
Females more							

Chapter 11
STRATIFICATION AND WORK-RELATED BEHAVIOR

This chapter will review what has been learned concerning sex differences in stratification and labor-related activities. Considerable evidence suggests that males and females approach these aspects of life in different ways.

11.1
FORMING HIERARCHIES AND CONTROLLING RESOURCES

The formation of hierarchies seems to be a common way used among social animals to exercise differential control over resources. The following section presents a summary of research findings with regard to sex differences in the formation of these hierarchies and its consequences in terms of access to resources.

11.1.1. Dominance-Related Behavior

Dominance is a complex and widespread phenomenon among social animals. It is usually predicated on individual recognition of individual social group members, and often involves ritualistic behavior of a deferential nature toward those who are dominant to oneself (Ellis 1993). The research on sex differences in dominance-related behavior is reviewed below.

11.1.1.1. Dominance in General

Numerous studies have sought to determine if dominance is more common among males than among females in numerous species. The results are presented below in two split-tables, one for humans and the remainder for all other species.

11.1.1.1a. Dominance in General (Humans)

According to most studies of humans, males display dominance behavior to a greater degree than females under a wide variety of social conditions (Split-Table 11.1.1.1a).

Split-Table 11.1.1.1a. Dominance in general (human).

Nature of Any Difference	Prepubertal				Postpubertal		Multiple Age Categories
		Toddler	Early Childhood	Childhood	Adolescent	Adult	
Males more			**NORTH AMERICA** *United States*: Hattwick 1937 (grabbing toys from others); Omark et al. 1975; Hold 1976; MH Goodwin 1980; Charlesworth & Dzur 1987* (physically)	**NORTH AMERICA** *United States*: Sheehy 1938	**NORTH AMERICA** *Canada*: Hakstian & Cattell 1975:307 (personality test); *United States*: Bernreuter 1933 (dominance-oriented); HD Carter 1935 (among twins, being dominance-oriented); Yarrow et al. 1958; RL McDonald & Gynther 1965 (self-rated); Savin-Williams 1979 (physically); Savin-Williams 1987	**ASIA** *Japan*: A Arkoff et al. 1962* (college); Doi 1973 (in marriage); *Russia*: J Sidanius et al. 1995* **EUROPE** *Sweden*: Ernulf & Innala 1995 (playful bondage experience); J Sidanius et al. 1995* **NORTH AMERICA** *United States*: RC Perry 1934 (college, being dominance-oriented); A Arkoff et al. 1962* (college); DM Buss 1981 (young); DM Buss & Craik 1981 (young); Aries & Johnson 1983 (young); Zimmer et al. 1983; Stake 1992 (young, self-report); Pratto et al. 1993 (young); Feingold 1994 (self-perception); Felmlee 1994 (marital relationships); J Sidanius et al. 1995*; M Conway et al. 1996; Jarvinen & Nicholls 1996:438 (young); JA Hall & Friedman 1999:1088 (young, vocally); TL Newton et al. 1999 (young); McCreary & Rhodes 2001 (young); Neff & Terry-Schmitt 2002* **OCEANIA** *Australia*: J Sidanius et al. 1995*	**EUROPE** *Germany*: Beckmann & Richter 1975 (self-rated) **MIDDLE EAST** *Israel*: Shepher & Tiger 1978 **NORTH AMERICA** *United States*: Spangler & Thomas 1962; DG Freedman 1979:186; Tannen 1990; Neff & Terry-Schmitt 2002* (college)
No signif. difference				**NORTH AMERICA** *United States*: McCloskey & Coleman 1992 (young, conversational dominance)		**NORTH AMERICA** *United States*: A Arkoff et al. 1962*(college, Japanese-Americans); KA Harris & Morrow 1992 (self-rated)	
Females more		**NORTH AMERICA** *United States*: Gellert 1961 (in opposite-sex dyads)	**NORTH AMERICA** *United States*: Charlesworth & Dzur 1987:199* (verbal persuasion)				**OCEANIA** *Tchambuli*: M Mead 1935/1950

11.1.1.1b. Dominance in General (Non-Human)

Research on dominance among non-human animals largely parallels that of humans in indicating that males exhibit more dominance behavior than females do under most social conditions (Split-Table 11.1.1.1b).

Split-Table 11.1.1.1b. Dominance in general (non-humans).

Nature of Any Difference				Postpubertal		Multiple Age Categories
				Adolescent	Adult	
Males more				**APE** *Chimpanzee*: Nadler & Braggio 1974*; *Orangutan*: Nadler & Braggio 1974*	**PRIMATE (EXCEPT APE)** *Baboon*: PC Lee & Oliver 1979*; LM Scott 1984; *Cereopithecine Monkey*: Andelman 1986; *Lemur*: Pereira & Kappeler 1997; *Macaque*: Sugiyama 1976; *Sifakas Lemur*: Kraus et al. 1999; *Spider Monkey*: LM Fedigan & Baxter 1984 (socially cohesive) **RODENT** *Rat*: N Adams & Boice 1983 (young)	**BIRD** *Chicken*: Guhl et al. 1945 (related to number of sex partners); *Magpie*: Komers & Dhindsa 1989 (related to number of sex partners) **CANINE** *Hyena*: Frank 1986; *Wolf*: Rabb et al. 1967 (related to number of sex partners) **INSECT** *Wasp*: S O'Donnell 1999 **PRIMATE (EXCEPT APE)** *Rhesus Monkey*: SD Singh 1969; Suomi 1977; *Macaques*: Drickamer 1974; Sugiyama & Ohsawa 1982; MA Cooper & Bernstein 2002:223
No signif. difference						
Females more				**PRIMATE (EXCEPT APE)** *Baboon*: PC Lee & Oliver 1979*	**APE** *Bonobo*: Kano 1992; de Waal & Lanting 1997	**APE** *Chimpanzee*: Yerkes 1940 (taking food from males during maximum sexual swelling)

11.1.1.2. Assuming/Accepting a Position Within a Social Hierarchy

Studies of sex differences in the tendency to assume a recognizable position within a social hierarchy indicates that males are more prone to do so than females or that there is no significant difference (Table 11.1.1.2).

Table 11.1.1.2. Assuming/accepting a position within a social hierarchy.

Nature of Any Difference	Prepubertal						Multiple Age Categories
				Childhood			
Males more				**NORTH AMERICA** *United States*: Thorne 1993			**EUROPE** *Switzerland*: Schmid Mast 2002* (beginning of a debate)
No signif. difference							**EUROPE** *Switzerland*: Schmid Mast 2002* (end of a debate)
Females more							

11.1.1.3. Stability of Dominant Hierarchies

Research surrounding sex differences in the stability of hierarchies among various species of monkeys have reached somewhat contradictory conclusions, but most studies indicate that the hierarchies of females are more stable than those of males (Table 11.1.1.3).

Table 11.1.1.3. Stability of dominant hierarchies.

Nature of Any Difference						Multiple Age Categories
Males more						**PRIMATE (EXCEPT APE)** *Bonnet Macaques*: N Koyama 1973 (field)
No signif. difference						
Females more						**PRIMATE (EXCEPT APE)** *Baboon*: Hausfater 1975; Bercovitch 1986; *Vervet Monkey*: JB Lancaster 1973

11.1.1.4. Intra-Sex Dominance

A few studies have compared intra-sex dominance patterns and have concluded that males exhibit greater dominance behavior toward other males than females do toward other females (Table 11.1.1.4).

Table 11.1.1.4. Intra-sex dominance.

Nature of Any Difference	Prepubertal			Postpubertal			
			Early Childhood			Adult	
Males more			**NORTH AMERICA** *Canada*: Serbin et al. 1982 (giving commands)			**NORTH AMERICA** *United States*: Schmid Mast 2001; Schmid Mast 2002	
No signif. difference							
Females more							

11.1.1.5. Inter-Sex Dominance

The vast majority of studies have concluded that males tend to be dominant over females. The exceptions are among chimpanzees during estrus and among certain species of lemurs (Table 11.1.1.5).

Table 11.1.1.5. Inter-sex dominance.

Nature of Any Difference	Prepubertal	Postpubertal		Multiple Age Categories
	Childhood	Adolescent	Adult	
Males more	**PRIMATE (EXCEPT APE)** *Pig-Tailed Macaque*: AJ Stynes et al. 1975* (captivity); *Rhesus Macaque*: AJ Stynes et al. 1975* (captivity)	**PRIMATE (EXCEPT APE)** *Pig-Tailed Macaque*: AJ Stynes et al. 1975* (captivity); *Rhesus Macaque*: AJ Stynes et al. 1975* (captivity)	**APE** *Chimpanzee*: HG Birch & Clark 1950* (captivity) **PRIMATE (EXCEPT APE)** *Campbell's Guenon*: C Hunkeler et al. 1972 (field); *Hamadryan Baboons*: JH Crook 1968 (field); *Nilgiri Langur*: FE Poirier 1970 (field); *Lorisiforme*: Bearder 1987	**MIDDLE EAST** *Israel*: Habash 1977 (Arab population, among spouses and siblings); Kacen et al. 1992 (Negev region, among spouses); Al-Krenawi 1996 (Negev region, among spouses and siblings) **NORTH AMERICA** *United States*: D Lott & Sommer 1956; Tindall et al. 1978 **PRIMATE (EXCEPT APE)** *Macaque*: Nieuwenhuijsen et al. 1988c:362; *Vervet Monkeys*: JB Lancaster 1973 (field)
No signif. difference				
Females more			**APE** *Chimpanzee*: HG Birch & Clark 1950* (captivity, during height of sexual swelling) **PRIMATE (EXCEPT APE)** *Lemur*: A Jolly 1984; AF Richard 1987	

11.1.1.6. Dominance or Status Striving (Career Aspirations)

Status striving refers to the tendency to devote substantial time and energy toward seeking to rise in dominance or social status. Most studies cited in Table 11.1.1.6 suggest that this tendency is more common among males than among females.

Table 11.1.1.6. Dominance-striving or status striving (career aspirations).

Nature of Any Difference	Prepubertal	Postpubertal	
	Childhood	Adolescent	Adult
Males more	**NORTH AMERICA** *United States*: Coie & Dodge 1998; Roy & Benenson 2002	**NORTH AMERICA** *United States*: F Harrison 1969 (education aspirations); LB Otto et al. 1974; HH Garrison 1979; Lueptow 1981	**NORTH AMERICA** *United States*: Powell & Butterfield 2003 (college)
No signif. difference		**NORTH AMERICA** *United States*: F Harrison 1969 (other aspirations)	
Females more		**NORTH AMERICA** *United States*: H Olive 1973	**NORTH AMERICA** *United States*: Leaper 1987 (young)

11.1.1.7. Leadership Outside the Home, Effectiveness of

Studies of the effectiveness of sex differences in leadership are often difficult to interpret, due in part to nuances in people's understandings of the term "effective." The findings shown in Table 11.1.1.7 suggest that the findings have been inconsistent. A review by Dobbins and Platz (1986) indicated that males were more effective leaders in laboratory experiments, but that there was no significant sex difference with regard to "real world" leadership effectiveness.

Table 11.1.1.7. Leadership outside the home, effectiveness of.

Nature of Any Difference	Postpubertal	
	Adolescent	Adult
Males more	**NORTH AMERICA** *United States*: Underwood et al. 1990 (mixed-sex problem solving tasks)	
No signif. difference		**NORTH AMERICA** *United States*: Stricker et al. 2001 (college students taking the GRE, leadership test scores)
Females more		**NORTH AMERICA** *Canada*: ND Cole 2004 (managers, score higher on transformational leadership skills); *United States*: Bartone et al. 2002 (military cadets, leadership test scores)

11.1.1.8. Achieving High Job Status/Authority/Eminence

The available research indicates that adult males are more likely than adult females to attain occupational eminence (Table 11.1.1.8).

Table 11.1.1.8. Achieving high job status/authority/eminence.

Nature of Any Difference	Postpubertal
	Adult
Males more	**NORTH AMERICA** *United States*: M Savage 1992; CL Williams 1992; Kanazawa 2000:319 (scientific achievement)
No signif. difference	
Females more	

11.1.1.9. Intergenerational Similarity in Dominance

Studies of a few species of nonhuman mammals have found that females are more likely than their brothers to assume the same social rank as their mothers in adolescence and/or adulthood (Table 11.1.1.9). The rank of males seems to depend more on factors other than any actions taken or precedence set by the mother.

Table 11.1.1.9. Intergenerational similarity in dominance.

Nature of Any Difference	Postpubertal	
	Adolescent	Adult
Males more		
No signif. difference		
Females more	**PRIMATE (EXCEPT APE)** *Japanese Macaque*: Kawai 1958 (dependent on mother's rank)	**PRIMATE (EXCEPT APE)** *Rhesus Macaque*: Sade 1967 **RODENT** *Rat*: Calhoun 1962

11.1.1.10. Relationship Between Status and Stress

Two studies of whether or not there was a sex difference in any link between occupational status and stress both concluded that lower status jobs were more stressful among males than among females.

Table 11.1.1.10. Relationship between status and stress.

Nature of Any Difference	Postpubertal
	Adult
Males more	**ASIA** *Japan*: Kawakami et al. 1995 (occupational status and job stress); Kawakami et al. 2004 (occupational status and job stress)
No signif. difference	
Females more	

11.1.2. Territorial and Spacing Behavior

The results of research surrounding gender differences in tendencies toward territoriality and interpersonal spacing behavior are reviewed below.

11.1.2.1. Personal Spacing Behavior

Studies of personal spacing behavior are typically based on observations of individuals when they sit or stand regarding how much space they occupy or attempt to occupy beyond that consisting of their bodies per se. As shown in Table 11.1.2.1, these studies have concluded that males tend to establish greater personal space than is true for females.

Table 11.1.2.1. Personal spacing behavior.

Nature of Any Difference	Prepubertal	Multiple Age Categories
	Early Childhood	
Larger in males		**EUROPE** *Germany*: Wex 1979 **NORTH AMERICA** *United States*: Hewes 1957; E Goffman 1959; NM Henley 1977
No signif. Difference	**NORTH AMERICA** *United States*: Melson 1977 (play territory)	
Larger in females		

11.1.2.2. Possessive Behavior

The tendency to be possessive was found to be greater among males than among females according to the one available study (Table 11.1.2.2).

Table 11.1.2.2. Possessive behavior.

Nature of Any Difference	Prepubertal
	Infant
Males more	**NORTH AMERICA** *United States*: Hay et al. 1983 (grabbing for attractive toys)
No signif. difference	
Females more	

11.1.2.3. Size of Territory or Home/Grazing Range

Numerous studies have compared the sexes with respect to the territories or grazing ranges that are occupied or controlled, with most of the research having been conducted among various species of ungulates (hooved animals). These studies have reached quite different conclusions with respect to the extent to which males or females generally control larger territories (Table 11.1.2.3).

Table 11.1.2.3. Size of territory or home/grazing range.

Nature of Any Difference	Postpubertal	Multiple Age Categories
	Adult	
Larger for males	**BIRD** *Warbler*: Petit et al. 1990 **CARNIVORE** *Caracol*: Avenant & Nel 1998; *Leopard*: Mizutani & Jewell 1998; *Stoat*: Alterio 1998; Samson & Raymond 1998 **MAMMAL** *Gray Seal*: CA Beck et al. 2003; *Harbour Seal*: Coltman et al. 1997; WD Bowen et al. 1999 **MUSTELID** *Ferret*: Norbury et al. 1998 **PRIMATE (EXCEPT APE)** *Baboon*: Rowell 1972:43 (territorial size); *Bushbaby*: Bearder 1987; *Suimang*: Chivers 1974 **RODENT** *Meadow Vole*: Gaulin & FitzGerald 1986* (a polygamous species); *Rat*: Behrends et al. 1986; JA Randall 1991; Ribble & Stanley 1998 **UNGULATE** *Bighorn Sheep*: Krausman et al. 1989; *Blacktail Deer*: Schoen & Kirchhoff 1985* (summer); Weckerly 1993; *Caribou*: TK Fuller & Keith 1981* (winter); *Elk*: McCorquodale et al. 1989 (summer); *Moose*: RB Addison et al. 1980; Sweanor & Sandergren 1989; BK Miller & Litvaitis 1992* (summer); Cederlund & Sand 1994; Kufeld & Bowden 1996; MacCracken et al. 1997* (winter); *Mouflon*: M Dubois et al 1994* (summer); *Mule Deer*: Pac et al. 1988* (summer); *Red Deer*: Lazo et al. 1994; Koubek & Hrabe 1996; *Roe Deer*: Cederlund 1983* (winter); NG Chapman et al. 1993; Koubek 1995* (summer); Danilkin 1996* (summer); Mysterud 1998 (summer); *Whitetail Deer*: Drolet 1976 (winter); ME Nelson & Mech 1981 (summer); Tierson et al. 1985; Beier & McCullough 1990	**APE** *Orangatang*: Galdikas 1988
No signif. difference	**RODENT** *Levant Vole*: Bodenheimer 1949; Cohn-Shlagman et al. 1984; *Mole-Rat*: Zuri & Terkel 1996; *Prairie Vole*: Gaulin & FitzGerald 1986* (a monogamous species); *Rat*: SA Barnett 1963 **UNGULATE** *Bighorn Sheep*: DM Leslie et al. 1996; *Moose*: Hauge & Keith 1981; Leptich & Gilbert 1989; *Mouflon*: M Dubois et al. 1994* (winter); *Pronghorn Sheep*: Hoskinson & Tester 1980* (summer); *Roe Deer*: Cederlund 1983* (summer); Thor 1990 (summer); Bjar et al. 1991 (summer); Cederlund et al. 1993 (summer); Schmidt 1993; Danilkin 1996* (winter)	
Larger for females	**BIRD** *Black Coucal*: Goymann et al. 2004b:812 (home range) **UNGULATE** *Blacktail Deer*: Schoen & Kirchhoff 1985* (winter); *Caribou*: Fuller & Keith 1981* (summer); *Moose*: RL Phillips et al. 1973; Miller & Litvaitis 1992* (winter); MacCracken et al. 1997* (summer); *Mule Deer*: Pac et al. 1988* (winter); Rautenstrauch & Krausman 1989; MC Nicholson et al. 1997; *Pronghorn Sheep*: Hoskinson & Tester 1980* (winter); TD Reynolds 1984 (summer); *Roe Deer*: NG Chapman et al. 1993; Koubek 1995* (winter); *Whitetail Deer*: Rongstad & Tester 1969 (winter)	

11.1.2.4. Territorial/Resource Procurement and Defense (Scent Marking)

Whereas findings about sex differences in the size of territories controlled by animals have been inconsistent, the picture in the case of active territory (or resource) procurement and defense is rather different. As one can see in Table 11.1.2.4, most studies have concluded that in most species, males are more active in procuring and defending territories and resources than are females.

Table 11.1.2.4. Territorial/resource procurement and defense (scent marking).

Nature of Any Difference					Postpubertal		Multiple Age Categories
	Infant					Adult	
Larger in males						**MARSUPIAL** *Gray Short-tailed Opossum*: BH Fadem & Cole 1985 (scent mark); BH Fadem & Corbett 1993a (scent mark); BH Fadem & Corbett 1997 (scent mark more after puberty) **PRIMATE (EXCEPT APE)** *Spider Monkey*: LM Fedigan & Baxter 1984 **RODENT** *Ground Squirrel*: FC Evans & Holdenried 1943	**BIRD** *Chicken*: G McBride & Foenander 1962; G McBride et al. 1969; *Starling*: Verheyen 1980 (secure nesting site); Feare 1984 (secure nesting site); Pinxten et al. 1989 (secure nesting site) **CANINE** *Dog*: IA Berg 1944 (urine mark); Martins & Valle 1948 (urine mark); MW Fox et al. 1975 (urine mark); *Wolf*: Asa et al. 1990 (urine mark) **RODENT** *Gerbil*: Ulibarri & Yahr 1988 (scent mark); *Ground Squirrel*: Owings et al. 1977
No signif. difference	**PRIMATES** *Lemur Catta*: L Gould 1990 (aggressive)						**CANINE** *Coyote*: Barrette & Messier 1980 (urine mark); Bowen & Cowan 1980 (urine mark); MC Wells & Beckoff 1981 (urine mark)
Larger in females							

11.2
PREPARATION FOR WORK

In the case of humans, especially those living in industrialized societies, considerable time is spent by both sexes in activities that prepare them for eventually entering the work force. This section reviews what has been determined regarding gender differences in this preparation.

11.2.1. Years of Education

As mentioned in the Preface, a few studies of gender differences are based on entire populations in a country rather than being based on samples. This is particularly true of studies to be reviewed in this section. When entire populations are studied, the concept of sampling error is no longer applicable. For these population-wide studies, when the differences between males and females exceeded five percent, a “significant” difference was declared; otherwise, differences were considered “not significant.”

11.2.1.1. Years of Education in General

Table 11.2.1.1 indicates that in most countries and time periods investigated, males received more years of education than females. Nevertheless, there are exceptions both in terms of no significant sex differences having been discovered and even some studies finding females receiving more education than males. Most of these latter studies involved North American and European countries in recent decades.

Table 11.2.1.1. Years of education in general.

Nature of Any Difference	Prepubertal	Postpubertal		Multiple Age Categories
	Childhood		Adult	
Males have more	**LATIN AMERICA** *Guatemala*: Gorman & Pollitt 1992; Stith et al. 2003:622		**ASIA** *Bangladesh*: Ruback et al. 2002:108*; *China*: Anson & Sun 2002:1047*; Yi et al. 2003 (elderly); *Multiple Countries*: Seguino 2000* **AFRICA** *Egypt*: Knodel & Jones 1996; *Ghana*: Fentiman et al. 1999 **EUROPE** *Germany*: J Smith & Baltes 1998 (elderly) **LATIN AMERICA** *Brazil*: Barreto et al. 2004:112 (elderly) **MIDDLE EAST** *India*: Sohoni 1998; Grover et al. 2003:4; Mathuranath et al. 2003:1059 (elderly); Raina et al. 2003:184; *Israel*: Y Cohen & Haberfeld 1998; *Pakistan*: Ruback et al. 2002:108*; *Turkey*: Temur 1971; *Several Arab Countries*: P Mansfield 1985:496 **NORTH AMERICA** *Canada*: V Walters et al. 2002:683 (except elderly); *United States*: CW Mueller 1980:147; Stranges et al. 2004:951 (middle age/elderly) **INTERNATIONAL** *Multiple Countries*: Dixon 1975; Papanek 1985; Blossfeld & Shavit 1993* (in 9 out of 13 countries); PT Schultz 1993; *Several Developing Countries*: Barro & Lee 1993:390; E King & Hill 1993	**AFRICA** *South Africa*: Mwabu & Schultz 2000:311; *Nigeria*: Egbo 2000:7; *Several Sub-Saharan Countries*: Odaga & Heneveld 1995 **NORTH AMERICA** *United States*: Kuo & Hauser 1996:127
No signif. difference			**ASIA** *Japan*: O'Reilly 1983:69* **EUROPE** *Finland*: Koivusilta et al. 1998:787 **MIDDLE EAST** *Israel*: Leviatan et al. 1976 **NORTH AMERICA** *Canada*: J McIntosh 1998:457; *United States*: Marini 1978b:494; Behrman & Taubman 1986:S136 **OCEANIA** *Phlippines*: Seguino 2000*	**ASIA** *China*: Anson & Sun 2002:1044*; *Japan*: O'Reilly 1983:69* **NORTH AMERICA** *United States*: England & Browne 1992:34; LB Dixon et al. 2000:550 (Hispanics)
Females have more			**EUROPE** *Poland*: Grajek 2003:27 **NORTH AMERICA** *Canada*: JK Folger & Nam 1967; Nakhaie & Curtis 1996:495 (young) **OCEANIA** *Philippines*: Estudillo et al. 2001 (current generation) **INTERNATIONAL** *Multiple Countries*: Blossfeld & Shavit 1993* (in 4 out of 13 countries)	**EUROPE** *Finland*: Haukkala 1999:448 **NORTH AMERICA** *United States*: O'Neill & Polachek 1993:209 (full-time workers in 1950)

11.2.1.2. Years of Education, Individual Variability in

One study indicated that males exhibited greater variability in years of education completed than was the case for females (Table 11.2.1.2).

Table 11.2.1.2. Years of education, individual variability in.

Nature of Any Difference					Postpubertal
					Adult
Males more					**EUROPE** *Finland*: Koivusilta et al. 1998:797 (young)
No signif. difference					
Females more					

11.2.1.3. Time Spent Studying/Paying Attention in Class

According to Table 11.2.1.3, all research has concluded that females spend more time studying than do males. These studies show that girls engage in more self-regulated and focused academic learning than boys, the latter being more haphazard in their approach to learning.

Table 11.2.1.3. Time spent studying/paying attention in class.

Nature of Any Difference	Prepubertal				Postpubertal	
				Childhood	Adolescent	Adult
Males more						
No signif. difference						
Females more				**EUROPE** *Britain*: JD Cummings 1944 (pay attention in school, teacher ratings)	**ASIA** *Singapore*: Liu 2005 (effort) **EUROPE** *Britain*: CG Rogers et al. 1998; Walters 1998; *Norway*: Storvoll & Wichstrom 2002:189 (self-report); *Slovenia*: Peklaj & Pecjak 2002 **NORTH AMERICA** *United States*: Perry 1929; EA Adams 1936 (time in libraries); JC Flanagan et al. 1964; Marini 1974; Marini 1978:494; **OCEANIA** *Australia*: Martin 2004 (effective learning strategies, more focused on studies, battery of personality tests & school performance measures); Schober et al. 2004 (among gifted students)	**EUROPE** *Britain*: Mellanby et al. 2000 (college) **NORTH AMERICA** *United States*: Ablard & Lipschultz 1998

11.2.1.4. Quality of Study Skills

Most of the studies undertaken to assess the quality of study skills people exhibit in generally conclude that the sexes do not differ to a significant degree (Table 11.2.1.4).

Table 11.2.1.4. Quality of study skills.

Nature of Any Difference	Prepubertal	Postpubertal
	Childhood	Adult
Males better		**EUROPE** *England*: Sadler-Smith 1996* (college, deep approach)
No signif. difference		**ASIA** *Hong Kong*: Sadler-Smith & Tsang 1998 (college) **EUROPE** *England*: JT Richardson 1993 (college); Duff 2002 (college) **OCEANIA** *Australia*: Watkins 1982 (college); RM Clarke 1986 (medical college); KL Wilson et al. 1996 (college)
Females better	**NORTH AMERICA** *United States*: Stroud & Lindquist 1942	**EUROPE** *England*: Sadler-Smith 1996* (college, surface approach)

11.2.1.5. Attending Primary School

Investigations regarding which gender is most likely to attend primary school have generally concluded that no differences are found, although when there are differences, they tend to favor males (Table 11.2.1.5).

Table 11.2.1.5. Attending primary school.

Nature of Any Difference	Prepubertal
	Childhood
Males more	**AFRICA** *Cameroon*: Amin & Fonkeng 2000:131 **ASIA** *Japan*: Ali et al. 2001:391* (from 1894-1906) **INTERNATIONAL** *Several Middle Eastern Countries*: Population Action International 1998 (in 1995)*
No signif. difference	**AFRICA** *Kenya*: Lloyd & Blanc 1996 **ASIA** *Japan*: Ali et al. 2001:391* (from 1906-1920) **EUROPE** *Greece*: Hopf & Hatzichristou 1999:5 **MIDDLE EAST** *Sri Lanka*: Population Action International 1998 (in 1995)* **OCEANIA** *Philippines*: Lim 2000:1300
Females more	**NORTH AMERICA** *United States*: Chowdhury et al. 2002 (in 2000)

11.2.1.6. Attending Secondary School

Results from studies of sex differences in high school or junior high school attendance have reached inconsistent conclusions (Table 11.2.1.6).

Table 11.2.1.6. Attending secondary school.

Nature of Any Difference	Postpubertal
	Adolescent
Males more	**AFRICA** *Liberia*: Republic of Liberia 1983 **INTERNATIONAL** *Multiple Countries*: Seguino 2002*
No signif. difference	**OCEANIA** *Philippines*: Lim 2000:1300; Seguino 2002* **INTERNATIONAL** *Several Western Countries*: Keeves 1973:49
Females more	**ASIA** *Hong Kong*: Seguino 2002* **AFRICA** *East Africa*: Stamback 2000 (Chagga tribe) **NORTH AMERICA** *United States*: RJ Turner & Gil 2002 **OCEANIA** *Malaysia*: Seguino 2002*; *Philippines*: Estudillo et al. 2001b:374 (rural); *Sri Lanka*: Seguino 2002*

11.2.1.7. Truancy

Truancy refers to unauthorized absence from school, usually among secondary school students. One study revealed that males are more prone to be truant than are females (Table 11.2.1.7).

Table 11.2.1.7. Truancy.

Nature of Any Difference	Postpubertal
	Adolescent
Males more	**NORTH AMERICA** *United States*: Silliker & Quirk 1997:290
No signif. difference	
Females more	

11.2.1.8. Graduating From High School

Many studies have compared the sexes with respect to the probability of graduating from high school. As shown in Table 11.2.1.8, these studies provide a mixed picture with respect to any significant differences. Several of the inconsistencies can be explained as due to generational factors: In the past, males were encouraged more than females to attend school, whereas in recent decades, there has been greater equality in this regard, especially in Western and industrialized countries.

Table 11.2.1.8. Graduating from high school.

Nature of Any Difference	Adult		Multiple Age Categories
	Young-to-Full Adult	Elderly	
Males more	**ASIA** *China*: Kinsella & Velkoff 2001:86* **EUROPE** *Germany*: Kinsella & Velkoff 2001:86* **LATIN AMERICA** *Bolivia*: Kinsella & Velkoff 2001:86* **OCEANIA** *Australia*: MacCann 1995 (longitudinal survey of academic performance) **INTERNATIONAL** *Several Western Countries*: Keeves 1973:49 (young)	**ASIA** *Russia*: Kinsella & Velkoff 2001:86*; *Singapore*: Kinsella & Velkoff 2001:86* **EUROPE** *Germany*: Kinsella & Velkoff 2001:86*; *Romania*: Kinsella & Velkoff 2001:86*; *Sweden*: Kinsella & Velkoff 2001:86* **LATIN AMERICA** *Bolivia*: Kinsella & Velkoff 2001:86*	**ASIA** *Thailand*: Sakamoto et al. 2001:390 **NORTH AMERICA** *United States*: Simoni-Wastila 2000:291
No signif. difference	**ASIA** *Singapore*: Kinsella & Velkoff 2001:86* **EUROPE** *Romania*: Kinsella & Velkoff 2001:86*; *Sweden*: Kinsella & Velkoff 2001:86* **LATIN AMERICA** *Brazil*: Kinsella & Velkoff 2001:86* **NORTH AMERICA** *Canada*: M Shannon & Kidd 2001:453; *United States*: Mare 1995; US Bureau of the Census 1998:Table 261; Kinsella & Velkoff 2001:86*; BA Jacob 2002:594 **OCEANIA** *Australia*: Kinsella & Velkoff 2001:86*	**ASIA** *China*: Kinsella & Velkoff 2001:86* **LATIN AMERICA** *Brazil*: Kinsella & Velkoff 2001:86* **NORTH AMERICA** *United States*: Kinsella & Velkoff 2001:86* **OCEANIA** *Australia*: Kinsella & Velkoff 2001:86*	
Females more	**ASIA** *Russia*: Kinsella & Velkoff 2001:86* **EUROPE** *Finland*: Koivusilta et al. 1998:797; *Poland*: Grajek 2003:27 **LATIN AMERICA** *Cuba*: Nunez Sarmiento 2003:11 **NORTH AMERICA** *United States*: US Bureau of the Census 1975:369; Whaley & Smyer 1998 (Blacks)		**NORTH AMERICA** *Canada*: Marsden & Harvey 1971:18

11.2.1.9. Having Attended (or Are Attending) College

Studies undertaken to determine which sex is most likely to attend college, regardless of whether they graduated, have led to mixed conclusions. Most of the inconsistencies can be explained by noting that in industrialized societies, beginning in the 1980-90s a greater number of females than males began attending college (Table 11.2.1.9).

Table 11.2.1.9. Having attended (or are attending) college.

Nature of Any Difference	Citation
Males more	**ASIA** *China*: B Hooper 1991; *Korea*: Korean Educational Development Institute 1982; *Thailand*: TP Schultz 1995 **AFRICA** *Nigeria*: Adeyemi & Akpotu 2004:368; *South Africa*: Mwabu & Schultz 2000* (Whites, Indians) **MIDDLE EAST** *Turkey*: Tansel 2002 **NORTH AMERICA** *Canada*: Boulet & Lavallee 1984:28; Looker & McNutt 1989; Kunz & Giesbrecht 1999 (Indo-Pakistanis); *United States*: Fonda 2000* (before 1980); CC Cole 1956; Werts 1966; Werts 1968; Marini 1974; GS Becker 1975:178; US Department of Education 1997* (1970s) **INTERNATIONAL** *Several Western Countries*: Keeves 1973:49 (in 1964); JA Jacobs 1996:158* (in 1990, 43/67 countries); *Multiple countries*: JA Jacobs 1996:Table 1* (42/67)
No signif. difference	**AFRICA** *South Africa*: Mwabu & Schultz 2000* (Blacks) **EUROPE** *Britain*: J Jones & Castle 1986 **NORTH AMERICA** *United States*: US Department of Commerce 1979:38 (in 1978) **INTERNATIONAL** *Multiple Countries*: JA Jacobs 1996:158* (in 1990, 7/67 countries)
Females more	**ASIA** *Japan*: Inoue & Ebara 1995 **EUROPE** *Spain*: J Fernandez & Mateo 1997:999 **NORTH AMERICA** *Canada*: D Kimura 1997; M Shannon & Kidd 2001:450 (1985-1998); *United States*: US Department of Education 1997* (after 1985); Fonda 2000* (after 1980); Gerald & Hussar 2000 (52% in 1985, 57% in 1999); Mortenson 1999; National Science Foundation 1999; Bae et al. 2000 **INTERNATIONAL** *Multiple Countries*: JA Jacobs 1996:158* (in 1990, 17/67 countries); JA Jacobs 1996:Table 1* (25/67 countries)

11.2.1.10. Relationship Between College Attendance and One-Parent Households

The likelihood that males will attend college decreases when they are raised in a single parent household; while the likelihood that females will attend college coming from a single parent household does not change (Table 11.2.1.10).

Table 11.2.1.10. Relationship between college attendance and one-parent households.

Nature of Any Difference	Citation
Males less likely to attend	**NORTH AMERICA** *United States*: BA Jacob 2002:595
No signif. difference	
Females less likely to attend	

11.2.1.11. Graduating From College

Most research undertaken to determine if males or females are more likely to graduate from college has either concluded that males graduate in greater proportions or that there is no significant difference (Table 11.2.1.11). However, it should be noted that since the 1990s in a few countries – the United States, most notably – women have been graduating from college at higher rates than men.

Table 11.2.1.11. Graduating from college.

Nature of Any Difference	Citations
Males more	**ASIA** *China*: Kinsella & Velkoff 2001:87*; *South Korea*: Kinsella & Velkoff 2001:87* **EUROPE** *Germany*: Kinsella & Velkoff 2001:87*; *Italy*: Kinsella & Velkoff 2001:87*; *Netherlands*: Kinsella & Velkoff 2001:87* **MIDDLE EAST** *India*: Kinsella & Velkoff 2001:87*; *Jordan*: Kinsella & Velkoff 2001:87*; *Turkey*: Kinsella & Velkoff 2001:87* **NORTH AMERICA** *United States*: HM Berg & Ferber 1983 (young); Wingard et al. 1983:168 (Whites); Widnall 1988:1741 (young); Karen 1991 (between 1960-1990); National Center for Educational Statistics 1994 (in 1992); US Department of Education 1997* (1970s); Kinsella & Velkoff 2001:87*; US Department of Education 2000* (1970); Surette 2001 (transfers from 2-year colleges)
No signif. difference	**ASIA** *China*: Kinsella & Velkoff 2001:87*; *Indonesia*: Kinsella & Velkoff 2001:87*; *Thailand*: Sakamoto et al. 2001:390 **EUROPE** *Britain*: E Rudd 1984 (honors); *Italy*: Kinsella & Velkoff 2001:87*; *Poland*: Kinsella & Velkoff 2001:87*; Adamchik & Bedi 2003:705; *Portugal*: Kinsella & Velkoff 2001:87*; *Sweden*: Kinsella & Velkoff 2001:87* **LATIN AMERICA** *Argentina*: Kinsella & Velkoff 2001:87*; *Brazil*: Kinsella & Velkoff 2001:87* **NORTH AMERICA** *United States*: Thiessen & Ross 1990:301 (college); US Bureau of the Census 1997*; Kinsella & Velkoff 2001:87*; Gill & Leigh 2000:165* (in 1970) **OCEANIA** *Australia*: Kinsella & Velkoff 2001:87*
Females more	**EUROPE** *Britain*: JTE Richardson 1993 (honors); J Smith & Naylor 2001 (honors); *Poland*: Grajek 2003 **LATIN AMERICA** *Cuba*: Nunez Sarmiento 2003:11 **NORTH AMERICA** *Canada*: M Shannon & Kidd 2001:453; *United States*: JA Jacobs 1995; US Bureau of the Census 1997*; US Department of Education 1997* (after 1985); Gill & Leigh 2000:165* (in 1993); US Department of Education 2000*

11.2.1.12. Being in Advanced Degree Programs

Advanced educational degree programs are those beyond the bachelor's degree. The limited studies on sex differences in advanced degree programs have concluded that males are more likely than females to be in these programs (Table 11.2.1.12).

Table 11.2.1.12. Being in advanced degree programs.

Nature of Any Difference	Citations
Males more	**EUROPE** *Norway*: Mastekaasa 2005 (adult, enroll in PhD programs) LE **NORTH AMERICA** *United States*: M Patterson & Engelberg 1978 (medical school); E Seymour & Hewitt 1997 (under grad & graduate training); Sax 2001 (under grad & graduate training); Mullen et al. 2003 (adult, enroll in PhD programs)
No signif. difference	
Females more	**EUROPE** *Britain*: D James & Driver 1999 (applied to medical school & percentage of applicants accepted)

11.2.1.13. Receiving Advanced/Graduate Degrees

Most studies have concluded that males are more likely than females to receive advanced college degrees (i.e., those beyond a bachelors) (Table 11.2.1.13).

Table 11.2.1.13. Receiving advanced/graduate degrees.

Nature of Any Difference	Citation
Males more	**EUROPE** *Britain*: AL Booth & Satchell 1995 (adult, completion of PhD program); *Germany*: Bornmann & Enders 2004:28 (doctorates in biology, business/economics, electrical engineering, German, mathematics, & social science) **NORTH AMERICA** *Canada*: D Kimura 1997* (PhD); *United States*: DG Johnson & Hutchins 1966 (medical school); WJ Knox 1970:1031 (doctorates); Bowen & Rudenstine 1992 (doctorate degrees in general); National Center for Educational Statistics 1994; US Bureau of the Census 1997* (advanced degrees); JG Baker 1998 (adult, completion of PhD program); TR Turner 2002* (PhD in biological anthropology; in the 1960s, 1970s, & 1980s) **INTERNATIONAL** *Several Industrial Countries*: Charles & Bradley 2002:581
No significant difference	**EUROPE** *Britain*: T Wright & Cochrane 2000 (adult, completion of PhD program); *Norway*: Mastekaasa 2005:388 (adult, completion of PhD program) **NORTH AMERICA** *United States*: Ehrenberg & Mavros 1995 (adult, completion of PhD program)
Females more	**NORTH AMERICA** *Canada*: D Kimura 1997* (MA); *United States*: TR Turner 2002* (PhD in biological anthropology; in the 1990s)

11.2.1.14. General Benefit From Job Training

Studies have shown that most job training programs benefit workers both in terms of job mobility and/or subsequent earnings. Research has consistently indicated that the sex differences are greater for females than for males (Table 11.2.1.14).

Table 11.2.1.14. General benefit from job training.

Nature of Any Difference	Postpubertal
	Adult
Males more	
No signif. difference	
Females more	**EUROPE** *Switzerland*: Li et al. 2000 (mobility) **NORTH AMERICA** *United States*: Ashenfelter 1978 (higher earnings); LM Lynch 1991 (mobility); Couch 1992 (higher earnings)

11.2.1.15. Failing to Pass a Grade

One study reported that males were more likely than females to be held back in school (Table 11.2.1.15).

Table 11.2.1.15. Failing to pass a grade.

Nature of Any Difference	Prepubertal
	Childhood
Males more	**NORTH AMERICA** *United States*: NH Falkner et al. 2001:37
No signif. difference	
Females more	

11.2.2. Main Area of Educational Training

Below, findings of sex differences in the types of specialized educational training students obtain are reviewed. The majority of these studies have to do with the college majors that individuals choose.

11.2.2.1. Masculine (vs. Feminine) College Majors

Masculine college majors are "things-oriented" and "ideas-oriented" (such as science, mathematics, architecture, and engineering) whereas feminine majors are usually "people-oriented" and "helping-oriented" (such as psychology, social science, nursing, and the humanities). All of the available research indicates that males are more likely to choose masculine majors than are females, and that females are more likely to choose feminine majors (Table 11.2.2.1).

Table 11.2.2.1. Masculine (vs. feminine) college majors.

Nature of Any Difference	Postpubertal	
		Adult
Males more		**NORTH AMERICA** *United States*: Polachek 1978 (college); Beller 1984 (college); JA Jacobs 1985 (college); Betz et al. 1990 (college)
No signif. difference		
Females more		

11.2.2.2. Majoring in (or Taking Advanced Courses in) Agriculture

The studies that assessed sex differences in completing doctorate programs in agriculture have concluded that men did so to a greater degree than women. However, one study failed to find a significant sex difference in the tendency to major in agriculture (Table 11.2.2.2).

Table 11.2.2.2. Majoring in (or taking advanced courses in) agriculture.

Nature of Any Difference	Postpubertal	
		Adult
Males more		**NORTH AMERICA** *United States*: National Research Council 1995 (PhD); National Research Council 1998 (PhD); Buttel & Goldberger 2002 (PhD)
No signif. difference		**NORTH AMERICA** *Canada*: Christie & Shannon 2001:169 (college)
Females more		

11.2.2.3. Majoring in (or Taking Advanced Courses in) Anthropology

Only one study was located concerning gender differences among those majoring in anthropology. It concluded that females do so more than males (Table 11.2.2.3).

Table 11.2.2.3. Majoring in (or taking advanced courses in) anthropology.

Nature of Any Difference	Postpubertal	
		Adult
Males more		
No signif. difference		
Females more		**NORTH AMERICA** *United States*: L Joy 2000:472 (college)

11.2.2.4. Majoring in (or Taking Advanced Courses in) Architecture

Research surrounding gender differences in the tendency to major in architecture has concluded that males do so more than females (Table 11.2.2.4).

Table 11.2.2.4. Majoring in (or taking advanced courses in) architecture.

Nature of Any Difference	Postpubertal	
		Adult
Males more		**EUROPE** *Norway*: Gotestam 1990b (college) **NORTH AMERICA** *United States*: National Center for Educational Statistics 1980
No signif. difference		
Females more		

11.2.2.5. Majoring in (or Taking Advanced Courses in) Biology

Table 11.2.2.5 summarizes findings concerning which sex is most likely to major in biology in college, or take an elective course in high school biology. The relevant studies have not reached consistent conclusions.

Table 11.2.2.5. Majoring in (or taking advanced courses in) biology.

Nature of Any Dif-erence	Postpubertal	
	Adolescent	Adult
Males more		**NORTH AMERICA** *United States*: National Research Council 1998 (PhD) **INTERNATIONAL** *Multiple Countries*: Charles & Bradley 2002:582 (10/12 countries)
No signif. difference		**NORTH AMERICA** *Canada*: Christie & Shannon 2001:169 (college); *United States*: L Joy 2000:472 (college)
Females more	**MIDDLE EAST** *Israel*: Ayalon 1995 (high school)	**EUROPE** *Britain*: Higher Education Statistics Agency 2001 (college); *Germany*: Bornmann & Enders 2004:30 (college)

11.2.2.6. Majoring in (or Taking Advanced Courses in) Business

Most studies of gender differences in the tendency to major in business found more males doing so than females (Table 11.2.2.6).

Table 11.2.2.6. Majoring in (or taking advanced courses in) business.

Nature of Any Difference	Postpubertal	
		Adult
Males more		**EUROPE** *Germany*: Bornmann & Enders 2004:30 **NORTH AMERICA** *Canada*: Christie & Shannon 2001:169 (college); *United States*: Yupin et al. 2000
No signif. difference		**NORTH AMERICA** *United States*: L Joy 2000:472 (college)
Females more		

11.2.2.7. Majoring in (or Taking Advanced Courses in) Computer Science

All of the research pertaining to which gender was most likely to major in computer science concluded that males were much more likely to do so than females (Table 11.2.2.7).

Table 11.2.2.7. Majoring in (or taking advanced courses in) computer science.

Nature of Any Difference	Postpubertal	
	Adolescent	Adult
Males more	**NORTH AMERICA** *United States*: Hess & Miura 1985 (high school computer-related training)	**EUROPE** *Britain*: UCCA 1992 (college); Higher Education Statistics Agency 2001 (college) **NORTH AMERICA** *United States*: National Center for Educational Statistics 1980; L Joy 2000:472 (college); PF Campbell & McCabe 1984 (college); Jagacinski et al. 1988 (college); VA Clarke & Chambers 1989 (college); HM Lips & Temple 1990 (college); Yupin et al. 2000
No signif. difference		
Females more		

11.2.2.8. Majoring in (or Taking Advanced Courses in) Criminal Justice

The one available study concerning sex differences in the tendency to major in criminal justice found that males were more likely than females to choose this major (Table 11.2.2.8).

Table 11.2.2.8. Majoring in (or taking advanced courses in) criminal justice.

Nature of Any Difference	Postpubertal	
		Adult
Males more		**NORTH AMERICA** *United States*: L Joy 2000:472 (college)
No signif. difference		
Females more		

11.2.2.9. Majoring in (or Taking Advanced Courses in) Economics

Several studies have indicates that males are more likely than females to major in economics (Table 11.2.2.9).

Table 11.2.2.9. Majoring in (or taking advanced courses in) economics.

Nature of Any Difference	Postpubertal
	Adult
Males more	**EUROPE** *Britain*: Higher Education Statistics Agency 2001 (college); *Germany*: Bornmann & Enders 2004:30 **NORTH AMERICA** *United States*: Lumsden & Scott 1986 (college); Canes & Rosen 1995 (college); Dynan & Rouse 1997 (college); EJ Jensen & Owen 2000 (college); L Joy 2000:472 (college); EJ Jensen & Owen 2001 (college)
No signif. difference	
Females more	

11.2.2.10. Majoring in (or Taking Advanced Courses in) Education

All of the research pertaining to gender differences in the tendency to major in education has concluded that females are more likely than males to do so (Table 11.2.2.10).

Table 11.2.2.10. Majoring in (or taking advanced courses in) education.

Nature of Any Difference	Postpubertal
	Adult
Males more	
No signif. difference	
Females more	**NORTH AMERICA** *United States*: National Center for Educational Statistics 1980; L Joy 2000:472 (college) **INTERNATIONAL** *Multiple Countries*: Charles & Bradley 2002:582 (12 out of 12 industrial countries)

11.2.2.11. Majoring in (or Taking Advanced Courses in) Engineering

Numerous studies have sought to determine if men or women who attend college are more likely to major in engineering. As shown in Table 11.2.2.11, all but one of these studies concluded that males are more likely to do so.

Table 11.2.2.11. Majoring in (or taking advanced courses in) engineering.

Nature of Any Difference	Postpubertal
	Adult
Males more	**AFRICA** *Nigeria*: Adeyemi & Akpotu 2004:372 (college) **EUROPE** *Britain*: Higher Education Statistics Agency 2001 (college); McNabb et al. 2002; *Germany*: Bornmann & Enders 2004:30 (electrical engineering) **NORTH AMERICA** *United States*: National Center for Educational Statistics 1980; Jagacinski & LeBold 1981; BM Vetter 1981; LG Humphreys 1984 (PhD); BM Vetter 1988; Ransom 1990 (college); National Science Foundation 1994; JA Jacobs 1995; Rosser 1995:103 (college); National Research Council 1998 (PhD); National Science Foundation 1998; National Science Foundation 1999; L Joy 2000:472 (college); National Opinion Research Center 2001 (PhD); Yupin et al. 2000 **INTERNATIONAL** *Multiple Countries*: Charles & Bradley 2002:582 (12/12 industrial countries)
No signif. difference	**NORTH AMERICA** *Canada*: Christie & Shannon 2001:169 (college)
Females more	

11.2.2.12. Majoring in (or Taking Advanced Courses in) Fine Arts

Females were found to be more likely than males to major in the fine arts in the one available study (Table 11.2.2.12).

Table 11.2.2.12. Majoring in (or taking advanced courses in) fine arts.

Nature of Any Difference	Postpubertal
	Adult
Males more	
No signif. difference	
Females more	**NORTH AMERICA** *Canada*: Christie & Shannon 2001:169 (college)

11.2.2.13. Majoring in (or Taking Advanced Courses in) Geography

The one available study pertaining to gender differences in geography majors indicated that these majors were more likely to be males than females (Table 11.2.2.13).

Table 11.2.2.13. Majoring in (or taking advanced courses in) geography.

Nature of Any Difference	Postpubertal
	Adult
Males more	**NORTH AMERICA** *United States*: L Joy 2000:472 (college)
No signif. difference	
Females more	

11.2.2.14. Majoring in (or Taking Advanced Courses in) the Health Sciences

One study of persons majoring in the health sciences concluded that doing so was more common among females than among males (Table 11.2.2.14).

Table 11.2.2.14. Majoring in (or taking advanced courses in) the health sciences.

Nature of Any Difference	Postpubertal
	Adult
Males more	
No signif. difference	
Females more	**NORTH AMERICA** *Canada*: Christie & Shannon 2001:169 (college)

11.2.2.15. Majoring in (or Taking Advanced Courses in) History

According to the single study located concerning which sex was more likely to major in history, males did so to a greater extent than females (Table 11.2.2.15).

Table 11.2.2.15. Majoring in (or taking advanced courses in) history.

Nature of Any Difference	Postpubertal
	Adult
Males more	**NORTH AMERICA** *United States*: L Joy 2000:472 (college)
No signif. difference	
Females more	

11.2.2.16. Majoring in (or Taking Advanced Courses in) the Humanities

The humanities cover such areas of study as the languages, the arts, philosophy, and sometimes history (thus overlapping the social sciences to some extent). Table 11.2.2.16 indicates that women are more likely than men to take advanced courses in the humanities.

Table 11.2.2.16. Majoring in (or taking advanced courses in) the humanities.

Nature of Any Difference	Postpubertal
	Adult
Males more	
No signif. difference	
Females more	**EUROPE** *Britain*: McNabb et al. 2002 (college); *Sweden*: Jonsson 1999 **MIDDLE EAST** *Israel*: Ayalon & Yogev 1997 **NORTH AMERICA** *Canada*: Christie & Shannon 2001:169 (college) **INTERNATIONAL** *Industrial Countries*: Charles & Bradley 2002:582 (12/12 countries)

11.2.2.17. Majoring in (or Taking Advanced Courses in) Language

All studies of sex differences in language majors have found that females are more prevalent than males in this area of training (Table 11.2.2.17).

Table 11.2.2.17. Majoring in (or taking advanced courses in) language.

Nature of Any Difference	Postpubertal	
		Adult
Males more		
No signif. difference		
Females more		**EUROPE** *Britain*: Higher Education Statistics Agency 2001 (college); McNabb et al. 2002 (college); *Germany*: Bornmann & Enders 2004:30 (college; German) **NORTH AMERICA** *United States*: National Center for Educational Statistics 1980; L Joy 2000:472 (college)

11.2.2.18. Majoring in (or Taking Advanced Courses in) Library Science

The single study of library science majors concluded that women were more likely than men to major in this field of study (Table 11.2.2.18).

Table 11.2.2.18. Majoring in (or taking advanced courses in) library science.

Nature of Any Difference	Postpubertal	
		Adult
Males more		
No signif. difference		
Females more		**NORTH AMERICA** *United States*: National Center for Educational Statistics 1980

11.2.2.19. Majoring in (or Taking Advanced Courses in) Mathematics

Many studies have compared the sexes with respect to majoring in mathematics, or, in the case of high school students, whether they are taking advanced courses in mathematics. As one can see in Table 11.2.2.19, all of the studies have concluded that males are more likely to major in mathematics than are females, and nearly all studies have concluded that in high school males are more likely than females to take advanced or elective courses in mathematics.

Table 11.2.2.19. Majoring in (or taking advanced courses in) mathematics.

Nature of Any Difference	Postpubertal		Multiple Age Categories
	Adolescent	Adult	
Males more	**EUROPE** *Britain*: Tabar 1992; *Germany*: Heller & Ziegler 1996; *Netherlands*: Ten Dam & Volman 1991; *Scotland*: Croxford 1994a; *Switzerland*: Beerman et al. 1992 **MIDDLE EAST** *Israel*: Ayalon & Yogev 1997; Zorman & David 2000; Ayalon 2002* (Jews) **NORTH AMERICA** *United States*: Haven 1972 (advanced courses); Fennema & Sherman 1977:55; Fennema & Carpenter 1981; Sherman 1981; SM Malcolm 1983; Eccles 1984; Chipman & Wilson 1985; LV Jones et al. 1986; J Oakes 1990; Catsambis 1994; Colley et al. 1994; Colangelo et al. 1996 (gifted students); Tai & Sadler 2001:1027 (high school, calculus) **OCEANIA** *Australia*: B Walsh 1979; Lamb 1996	**EUROPE** *Germany*: Bornmann & Enders 2004:30 **NORTH AMERICA** *Canada*: Christie & Shannon 2001:169 (college); *United States*: National Center for Educational Statistics 1980; JM Armstrong 1981; Lawrence Hall of Science 1982; Berryman 1983; JV Andrews 1985; K Wilson & Boldizar 1990 (college); Ransom 1990 (college); Rosser 1995:103 (college); SE Turner & Bowen 1999 (college); L Joy 2000:472 (college) **INTERNATIONAL** *Several Industrial Countries*: Charles & Bradley 2002:582	**NORTH AMERICA** *United States*: Pedro et al. 1980 (9th & 10th grade); Eccles-Parsons 1984
No signif. difference	**EUROPE** *Britain*: LB Barnett & Corazza 1998 (gifted students) **MIDDLE EAST** *Israel*: Ayalon 2002* (Arabs) **NORTH AMERICA** *United States*: Eccles 1984:118; Stocking & Goldstein 1992 (gifted students)		
Females more	**NORTH AMERICA** *United States*: Pajares 1996 (gifted students)		

11.2.2.20. Majoring in (or Taking Prepatory Courses for) Medical School Training

The studies located on the proportion of men and women being trained as physicians and nurses have not reached entirely consistent conclusions (Table 11.2.2.20).

Table 11.2.2.20. Majoring in (or taking prepatory courses for) medical school training.

Nature of Any Difference	Postpubertal
	Adult
Males more	**NORTH AMERICA** *Canada*: J Park et al. 2005 (specialize in surgery); *United States*: RW Schwartz et al. 1989 (surgeon); Gordin et al. 1991 (surgeon); Redmond et al. 1994 (surgeon); Novielli et al. 2001 (surgeon); Gelfand et al. 2002 (surgeon)
No signif. difference	**AFRICA** *Jordan*: Al-Ma'aitah et al. 1996:223 (nursing) **NORTH AMERICA** *Canada*: S Evans & Sarani 2002; *United States*: American Association of Medical Colleges 2004
Females more	**NORTH AMERICA** *Canada*: Christie & Shannon 2001:169 (college, nursing)

11.2.2.21. Majoring in (or Taking Advanced Courses in) Physics, Chemistry, or General Physical Science

Table 11.2.2.21 provides a summary of numerous findings regarding sex differences in the tendency to major in physics, chemistry, or general physical science. In all cases, more males than females received both undergraduate and advanced degrees in the physical sciences. Similarly, with only one exception, males were found to be more likely to take advanced high school courses in the physical sciences than females.

The exception involved Arabs living in Israel. It may be understood in terms of the sex-segregated education that most Arab students receive. Specifically, sex-segregated education has been associated with females taking more mathematics and science courses than when they attend sex-integrated schools (Lee & Lockheed 1990; Gillibrand et al. 1999).

Table 11.2.2.21. Majoring in (or taking advanced courses in) physics, chemistry, or general physical science.

Nature of Any Difference	Postpubertal	
	Adolescent	Adult
Males more	**EUROPE** *Britain*: Tabar 1992; *Germany*: Heller & Ziegler 1996; *Netherlands*: Ten Dam & Volman 1991; *Scotland*: Croxford 1994a; *Sweden*: Engstrom & Noonan 1990; Jonsson 1999 (natural science & technology) **MIDDLE EAST** *Israel*: Tamir 1990; Ayalon & Yogev 1997; Ayalon 1995 (high school) **NORTH AMERICA** *United States*: Crowley & Lane 1986 (high school); A Kelly 1988 (high school); J Oakes 1990; Catsambis 1994; Kumagai 1995:73 (physics); Burkam et al. 1997; Tai & Sadler 2001:1027* (high school) **INTERNATIONAL** *Multiple Countries*: A Kelly 1976	**AFRICA** *Nigeria*: Adeyemi & Akpotu 2004:372 (college) **EUROPE** *Britain*: Higher Education Statistics Agency 2001 (college) **NORTH AMERICA** *United States*: LR Harmon & Soldz 1963 (PhD); MS White 1970 (college); E Smith 1978 (college); A Kelly 1979 (college); National Center for Educational Statistics 1980; Berryman 1983; LG Humphreys 1984 (PhD); TL Hilton & Lee 1988; Ware & Lee 1988; KC Green 1989; Ransom 1990 (college); SG Brush 1991:406 (PhD); National Research Council 1991; Frazier-Kouassi et al. 1992 (physical science); Rosser 1995:103 (college); S Hanson 1996 (college, natural science); Curtin et al. 1997 (PhD in physics); National Research Council 1998 (PhD); National Science Foundation 1998 (natural science); L Joy 2000:472 (college, physical science); National Opinion Research Center 2000 (PhD); National Science Foundation 2000 (PhD); National Opinion Research Center 2001 (PhD); Tai & Sadler 2001:1027* (college); Ferreira 2003 (completion of PhD in physical science); Yupin et al. 2000 (physical science)
No signif. difference	**MIDDLE EAST** *Israel*: Ayalon 2002 (Arabs)	
Females more		

11.2.2.22. Majoring in (or Taking Advanced Courses in) Political Science

Limited research surrounding political science as a college major indicates that men and women are equally likely to obtain their degree in this discipline (Table 11.2.2.22).

Table 11.2.2.22. Majoring in (or taking advanced courses in) political science.

Nature of Any Difference	Postpubertal
	Adult
Males more	
No signif. difference	**NORTH AMERICA** *United States*: L Joy 2000:472 (college)
Females more	

11.2.2.23. Majoring in (or Taking Advanced Courses in) Primatology

According to a couple of studies, females were more likely than males to take advanced courses in the field of primatology (Table 11.2.2.23).

Table 11.2.2.23. Majoring in (or taking advanced courses in) primatology.

Nature of Any Difference	Postpubertal
	Adult
Males more	
No signif. difference	
Females more	**NORTH AMERICA** *United States*: MF Small 1984 (grad school); LM Fedigan 1994

11.2.2.24. Majoring in (or Taking Advanced Courses in) Psychology

At least in the United States, psychology as a major and/or an area of advanced study has attracted more women than men (Table 11.2.2.24), especially since the 1970s.

Table 11.2.2.24. Majoring in (or taking advanced courses in) psychology.

Nature of Any Difference	Postpubertal
	Adult
Males more	**NORTH AMERICA** *United States*: Pion et al. 1996* (college, in 1971)
No signif. difference	
Females more	**NORTH AMERICA** *United States*: JA Howard et al. 1986 (PhD); Ostertag & McNamara 1991; Pion et al. 1996* (college, in 1995); National Center for Education Statistics 1999 (college); L Joy 2000:472 (college); Harton & Lyons 2003 (college)

11.2.2.25. Majoring in (or Taking Advanced Courses in) Religion

A single study reported that males were more likely than females to major in the field of religion (Table 11.2.2.25).

Table 11.2.2.25. Majoring in (or taking advanced courses in) religion.

Nature of Any Difference	Postpubertal
	Adult
Males more	**NORTH AMERICA** *United States*: L Joy 2000:472 (college)
No signif. difference	
Females more	

11.2.2.26. Majoring in (or Taking Advanced Courses in) Science and Technology

Studies in various Western countries have concluded that men were more likely to major in science and technology-related disciplines than were women (Table 11.2.2.26).

Table 11.2.2.26. Majoring in (or taking advanced courses in) science and technology.

Nature of Any Difference	Postpubertal
	Adult
Males more	**EUROPE** *Britain*: Her Majesty's Stationary Office 1994 (college); McNabb et al. 2002; *Switzerland*: Beerman et al. 1992 **NORTH AMERICA** *United States*: Colley et al. 1994; KA Heller & Ziegler 1996; Lupart et al. 2004
No signif. difference	
Females more	

11.2.2.27. Majoring in (or Taking Advanced Courses in) Secretarial Studies

The one available study on gender differences in the tendency to major in secretarial studies concluded that more females than males did so (Table 11.2.2.27).

Table 11.2.2.27. Majoring in (or taking advanced courses in) secretarial studies.

Nature of Any Difference	Postpubertal
	Adult
Males more	
No signif. difference	
Females more	**NORTH AMERICA** *Canada*: Christie & Shannon 2001:169 (college)

11.2.2.28. Majoring in (or Taking Advanced Courses in) Social Science

The social sciences nearly always include such disciplines as sociology, anthropology, and political science, and often also include economics, history, and even psychology. The studies of sex differences in choosing the various social sciences as a major have reached inconsistent conclusions (Table 11.2.2.28).

Table 11.2.2.28. Majoring in (or taking advanced courses in) social science.

Nature of Any Difference	Postpubertal
	Adult
Males more	**EUROPE** *Germany*: Bornmann & Enders 2004:30
No signif. difference	**NORTH AMERICA** *Canada*: Christie & Shannon 2001:169 (college); *United States*: National Research Council 1998 (PhD)
Females more	**EUROPE** *Britain*: McNabb et al. 2002 (college)

11.2.2.29. Majoring in (or Taking Advanced Courses in) Social Work

The one study that specifically considered social work as a college major concluded that women were more likely to men to major in this discipline (Table 11.2.2.29).

Table 11.2.2.29. Majoring in (or taking advanced courses in) social work.

Nature of Any Difference	Postpubertal
	Adult
Males more	
No signif. difference	
Females more	**NORTH AMERICA** *United States*: L Joy 2000:472 (college)

11.2.2.30. Majoring in (or Taking Advanced Courses in) Sociology

According to the single available study, a greater number of females than males choose sociology as a college major (Table 11.2.2.30).

Table 11.2.2.30. Majoring in (or taking advanced courses in) sociology.

Nature of Any Difference	Postpubertal
	Adult
Males more	
No signif. difference	
Females more	**NORTH AMERICA** *United States*: L Joy 2000:472 (college)

11.2.2.31. Vocational/Professional/Technical Training Other Than College

As an alternative to attending college, some people obtain formal technical training in any of a number of areas. Two studies were located concerning gender differences in such training and indicated that males were more likely than females to do so (Table 11.2.2.31).

Table 11.2.2.31. Vocational/professional/technical training other than college.

Nature of Any Difference	Postpubertal	Multiple Age Categories
	Adult	
Males more	**EUROPE** *Poland*: Grajek 2003:27	**NORTH AMERICA** *United States*: CF Epstein & Feldman 1972:605
No signif. difference		
Females more		

11.3

BASIC DIVISION OF LABOR

Social science research surrounding sex differences in the division of labor has a long history, particularly in the disciplines of anthropology, economics, and sociology. The tables below provide a bird's eye summary of what has been learned with respect to how males and females differ in their tendencies to contribute to both the paid and unpaid human labor effort.

11.3.1. Participation in the Paid Workforce

Research findings pertaining to gender differences in being involved in the paid workforce are reviewed below.

11.3.1.1. Participation in the Paid Workforce in General

Many studies have compared the proportional representation of males and females in the overall work force. With respect to adult workers, research worldwide has determined that males are substantially more represented than are females. However, in some rural areas of developing Asian countries one finds the sex ratio of workers during childhood and adolescence to be equal or to be female-dominant (Table 11.3.1.1).

Table 11.3.1.1. Participation in the paid workforce in general.

Nature of Any Difference	Prepubertal				Postpubertal		Multiple Age Groups
				Childhood	Adolescent	Adult	
Males more				**AFRICA** *Botswana*: Mueller 1984* (rural) **ASIA** *Bangladesh*: Cain 1980* (rural); *Indonesia*: Nag et al. 1980* (6-8 yr olds, rural Java)	**AFRICA** *Botswana*: Mueller 1984* (rural) **ASIA** *Bangladesh*: Cain 1980* (rural); *Indonesia*: Hart 1980 (rural Java); Nag et al. 1980* (rural Java) **OCEANIA** *Philippines*: Evenson et al. 1980* (rural)	**AFRICA** *Ethiopia*: Kinsella & Velkoff 2001:100-101*; *South Africa*: Mwabu & Schultz 2000:311; *Tunisia*: Kinsella & Velkoff 2001:100-101* **ASIA** *Hong Kong*: Fan & Lui 2003:615* (in 1981); *Japan*: Shimada & Higuchi 1985; Kinsella & Velkoff 2001:94-97*; *Korea*: National Statistics Office 1993; Lee & Cho 1976; *Singapore*: Kinsella & Velkoff 2001:100*; *South Korea*: Kinsella & Velkoff 2001:100*; *Several Asian Countries*: Seguino 2000:24 **EUROPE** *Austria*: Kinsella & Velkoff 2001:94-97*; *Belgium*: Kinsella & Velkoff 2001:94-97*; *Britain*: Joshi et al. 1985; *Bulgaria*: Kinsella & Velkoff 2001:94-97*; *Czech Republic*: Kinsella & Velkoff 2001:94-97*; *Finland*: Pfau-Effinger 1994*; *France*: Riboud 1985; Kinsella & Velkoff 2001:94-97*; *Germany*: Granz 1985; Pfau-Effinger 1994*; Kinsella & Velkoff 2001:94-97*; *Hungary*: Kinsella & Velkoff 2001:94-97*; *Italy*: Colombino & De Stavola 1985; Kinsella & Velkoff 2001:94-97*; *Luxembourg*: Kinsella & Velkoff 2001:94-97*; *Multiple European Countries*: David & Starzec 1992 (2/2 countries); Haavio-Mannila & Kauppinen 1992 (5/5 countries); Wolchik 1992 (post-communist); Meulders et al. 1993; Pott-Buter 1993; *The Netherlands*: Hartog & Theeuweis 1985; *Poland*: Kinsella & Velkoff 2001:94-97*; *Spain*: Iglesias & Ribound 1985; *Sweden*: Gustofsson & Jacobsson 1985; Kinsella & Velkoff 2001:94-97* **LATIN AMERICA** *Argentina*: Kinsella & Velkoff 2001:100*; *Chile*: H Beyer 1995; Kinsella & Velkoff 2001:100-101*; *Cuba*: Nunez Sarmiento 2003:11; *Mexico*: Kinsella & Velkoff 2001:100-101*; *Peru*: Kinsella & Velkoff 2001:100-101*; *Uruguay*: Kinsella & Velkoff 2001:100-101* **MIDDLE EAST** *India*: S Gleason 2001:115; *Israel*: Ben-Porath & Gronau 1985; Lewin-Epstein & Semyonov 1992; *Turkey*: Kinsella & Velkoff 2001:100-101* **NORTH AMERICA** *Canada*: Kinsella & Velkoff 2001:94-97*; M Denton et al. 2004:2591; *United States*: Ferris 1971; Edholm 1973:274; Matthaei 1982 (since 1900); JW Hill et al. 1985 (persons with mental retardation); O'Neill 1985; Reimers 1985; JP Smith & Ward 1985; Bielby & Bielby 1989; LA Leslie et al. 1991; Spain & Bianchi 1996; D Olson et al. 2000 (persons with mental retardation); Simoni-Wastila 2000:291; Kinsella & Velkoff 2001:94-97* **OCEANIA** *Australia*: Gregory et al. 1985; Kinsella & Velkoff 2001:94-97*; *New Zealand*: Kinsella & Velkoff 2001:94-97* **INTERNATIONAL** *Multiple Countries*: Dex & Shaw 1986 (2/2 countries); Antecol 2000 (80/80 countries); Blackburn et al. 2000:122 (32/32 countries); *Western Industrial Countries*: Gottschalk & Smeeding 1997:643; Gornick & Jacobs 1998:699; Nordenmark 2004:237	**NORTH AMERICA** *Canada*: Statistics Canada 2003; *United States*: Kregel & Wehman 1989 (persons with mental retardation); Blackorby & Wagner 1996 (persons with mental retardation) **INTERNATIONAL** *Multiple Countries*: Dixon 1975 (all ages)
No signif. difference				**OCEANIA** *Philippines*: Evenson et al. 1980* (rural)	**ASIA** *Nepal*: Nag et al. 1980* (15-19 yr olds, rural)	**ASIA** *Hong Kong*: Fan & Lui 2003: 615* (in 1991) **EUROPE** *Soviet Union*: JS Schwartz 1979:83	
Females more				**ASIA** *Indonesia*: Nag et al. 1980* (9-11 yr olds, rural Java) **MIDDLE EAST** *India*: Saraswathi & Dutta 1988* (rural)	**ASIA** *Nepal*: Nag et al. 1980* (12-14 yr olds, rural); *Indonesia*: Nag et al. 1980* (12-24 yr olds, rural Java) **MIDDLE EAST** *India*: Saraswathi & Dutta 1988* (rural)		

11.3.1.2. Engaging in Business Activities

According to several studies, males appear to be more involved in a wide variety of business activities than are females (Table 11.3.1.2).

Table 11.3.1.2. Engaging in business activities.

Nature of Any Difference			Multiple Age Categories
Males more			**NORTH AMERICA** *United States*: DL Hoffman et al. 1996 (e-commerce); BM Barber & Odean 2001 **INTERNATIONAL** *No Specific Country*: Kwak et al. 2002 (e-commerce)
No signif. difference			
Females more			

11.3.1.3. Job Absenteeism/Missing Work

According to two studies, job absenteeism is more common among female workers than among male workers (Table 11.3.1.3).

Table 11.3.1.3. Job absenteeism/missing work.

Nature of Any Difference					Postpubertal	
					Adult	
Males more						
No signif. difference					**NORTH AMERICA** *United States*: Giele 1978:105 (full-time workers)	
Females more					**NORTH AMERICA** *United States*: JP Leigh 1983; Vistnes 1997	

11.3.2. Employment in General

At least at some point in life, almost everyone is employed. The following tables examine gender differences in various aspects of employment.

11.3.2.1. Full Time Employment in General

In all societies yet studied, males are more likely to be employed full time than are females (Table 11.3.2.1). Most of the relevant studies are listed in the multiple age column rather than the adult column because most of the relevant studies did not specify the age of the workers, although one can assume that the vast majority were adults.

Table 11.3.2.1. Full time employment in general.

Nature of Any Difference	Postpubertal		Multiple Age Categories
		Adult	
Males more		**ASIA** *Japan*: Inoue & Ebara 1995 **LATIN AMERICA** *Brazil*: Giatti & Barreto 2002 (over 60) **NORTH AMERICA** *Canada*: V Walters et al. 2002:683 (except elderly); *United States*: Schulz 1976:40 (elderly); Atchely 1977:235; SL Blair & Lichter 1991 (adult); PE Becker & Hofmeister 2001:711 **OCEANIA** *Philippines*: Lim 2000	**AFRICA** *South Africa*: Mwabu & Schultz 2000:311; *Zambia*: Floro & Schaefer 1998:88 **ASIA** *Japan*: Gottfried & Hayashi-Kato 1998; *India*: Duraisamy 2002:611 **EUROPE** *Britain*: C Fagan 1996; L Blackwell 2001; *Germany*: Statistisches Amt der DDR 1990; *Several European Countries*: European Commission 1996; Bielenski & Koehler 1999; Delsen 1999; Meulders & Plasman 1999; Rubery et al. 1999 **NORTH AMERICA** *Canada*: CL Jones et al. 1990; Zeytinoglu 1999; *United States*: US Department of Labor 1983 (continuous); Pleck & Staines 1985; MA Adler 1993:455; CE Ross & Bird 1994; Nollen 1996; Kalleberg et al. 1997; DG Gallagher 1999; Nollen 1999 **OCEANIA** *Australia*: Quinlan & Mayhew 1999 **INTERNATIONAL** *Multiple Countries*: E Draper 1985; *Several Industrialized Nations*: Baude & Holmberg 1967:105
No signif. difference			
Females more			

11.3.2.2. Job-Seeking Behavior

According to two studies of job seeking behavior, men devote more time to this activity than do women (Table 11.3.2.2).

Table 11.3.2.2. Job-seeking behavior.

Nature of Any Difference	Postpubertal
	Adult
Males more	**NORTH AMERICA** *United States*: CR Leana & Feldman 1991; CR Wanberg et al. 1996
No signif. difference	
Females more	

11.3.2.3. Employed Part-Time

The available research on gender differences in being employed part time has consistently found this job status to be more characteristic of females than of males (Table 11.3.2.3).

Table 11.3.2.3. Employed part-time.

Nature of Any Difference	Postpubertal	Multiple Age Categories
	Adult	
Males more		
No signif. difference		
Females more	**EUROPE** *Britain*: V Beechey & Perkins 1987; J Jenson et al. 1988 **OCEANIA** *Australia*: Australian Bureau of Statistics 1993 **INTERNATIONAL** *Multiple Industrial Countries*: Kinsella & Velkoff 2001:105 (elderly)	**EUROPE** *Britain*: Paci et al. 1995; Arber & Gilbert 1992; *Sweden*: Jallinoja 1985

11.3.2.4. Employment in High Paying Establishments/Businesses

According to a limited number of studies, males are more likely than females to be employed in higher paying establishments and businesses, even within narrow occupational categories (Table 11.3.2.4).

Table 11.3.2.4. Employment in high paying establishments/businesses.

Nature of Any Difference	Postpubertal
	Adult
Males more	**NORTH AMERICA** *United States*: JN Baron & Bielby 1980; J Dixon & Seron 1995 (legal profession); D Guthrie & Roth 1999
No signif. difference	
Females more	

11.3.2.5. Unemployed or Seeking Work

A few studies have compared the sexes regarding whether they are unemployed or still employed while searching for a job. Most of these studies indicate that females are more likely than males to be seeking work while they are unemployed (Table 11.3.2.5).

Table 11.3.2.5. Unemployed or seeking work.

Nature of Any Difference		Multiple Age Categories
	Adult	
Males more	**NORTH AMERICA** *United States*: Maxwell & D'Amico 1986 (among full-time workers who have been laid off)	
No signif. difference		
Females more	**NORTH AMERICA** *United States*: CJ Wong et al. 2002 (among cocaine addicts)	**AFRICA** *South Africa*: Mwabu & Schultz 2000:311; *Zambia*: Floro & Schaefer 1998:81

11.3.2.6. Unpaid/Volunteer Work

According to two studies cited in Table 11.3.2.6, females are more likely than males to be engaged in volunteer work.

Table 11.3.2.6. Unpaid/volunteer work.

Nature of Any Difference	Postpubertal
	Adult
Males more	
No signif. difference	
Females more	**NORTH AMERICA** *United States*: R Stone et al. 1987 (care to elderly); Ory et al. 1999 (care to elderly)

11.3.2.7. Receiving Public Assistance/Welfare

One study of cocaine addicts concluded that females were more likely to be receiving public assistance funding than were males (Table 11.3.2.7).

Table 11.3.2.7. Receiving public assistance/welfare.

Nature of Any Difference	Postpubertal
	Adult
Males more	
No signif. difference	
Females more	**NORTH AMERICA** *United States*: CJ Wong et al. 2002 (among cocaine addicts)

11.3.3. Amount of Time Worked

Research on the amount of time individuals spend working in various capacities is summarized in the following tables.

11.3.3.1. Time Spent in Labor Market (Age Adjusted)

Several studies have found that males have spent more time in the labor market than is true for females of comparable age (Table 11.3.3.1).

Table 11.3.3.1. Time spent in labor market (age adjusted).

Nature of Any Difference	Postpubertal	Multiple Age Categories
	Adult	
Males more	**NORTH AMERICA** *United States*: Mincer & Polachek 1974; Polachek 1975; GN Powell 1999:ix; D Olson et al. 2000 (workers with mental retardation) **INTERNATIONAL** *Several Latin American Countries*: Singelmann & Tienda 1979; *Several Industrial Countries*: KB Ward & Pampel 1985	**EUROPE** *Germany*: Harhoff 1998 **NORTH AMERICA** *United States*: Sandell & Shapiro 1978; Corcoran & Duncan 1979; Goldin 1986; RG Wood et al. 1993 (attorneys); Blackorby & Wagner 1996 (workers with mental retardation)
No signif. difference		
Females more		

11.3.3.2. Turnover Rates/Job Quitting

Four studies have indicated that females are more likely than males to quit their employment (Table 11.3.3.2).

Table 11.3.3.2. Turnover rates/job quitting.

Nature of Any Difference	Postpubertal
	Adult
Males more	
No signif. difference	
Females more	**ASIA** *Japan*: Bando 1986; Creighton 1996 **EUROPE** *Britain*: Royalty 1996 (in and out of employment) **NORTH AMERICA** *United States*: Markham et al. 1983 (dissatisfied with wages); Sicherman 1996 (voluntarily quit); Balkin & Gomez-Mejia 2002 (university professors, dissatisfied with wages)

11.3.3.3. Variability of Time Spent in Labor Market

Persons who are in and out of the labor market frequently are said exhibit high variability in this regard. Several studies have indicated that females exhibit greater variability than do males in terms of the time they spend in the labor market (Table 11.3.3.3).

Table 11.3.3.3. Variability of time spent in labor market.

Nature of Any Difference	Postpubertal
	Adult
Males vary more	
No signif. difference	
Females vary more	**EUROPE** *Britain*: Hakim 1996; Royalty 1998; Rubery et al. 1998; *Italy*: Chelli & Rosti 2002 **NORTH AMERICA** *United States*: Corcoran & Duncan 1979; FD Blau & Kahn 1981; US Department of Labor 1983 (move in & out of the workforce)

11.3.3.4. Hours Worked Per Day or Week as Part of One's Job or Profession

According to all available studies, males report working longer hours as part of their career than do their female counterparts (Table 11.3.3.4).

Table 11.3.3.4. Hours worked per day or week as part of one's job or profession.

Nature of Any Difference	Postpubertal
	Adult
Men more	**EUROPE** *Britain*: C Marsh 1991; Harkness 1999; C Fagan 2001:1203; *Germany*: L Bell & Freeman 1995* **NORTH AMERICA** *United States*: Pleck 1985 (dual-career couples, per week); R Hertz 1986 (dual-career couples, per week); DL Chambers 1989 (lawyers, per week); Uhlenberg & Cooney 1990 (physicians, per week); AM Richardsen & Burke 1991 (physicians, per week); L Bell & Freeman 1995*; Dedobbeleer et al. 1995 (physicians, per week); Kaldenberg et al. 1995 (dentists); Nordstrom et al. 1995 (farm work); Milkie & Peltola 1999; Sobecks et al. 1999 (physicians, per week); JE Wallace 1999:811 (lawyers); JE McMurray et al. 2000 (physicians, per week); TJ Hoff 2004:306 (physicians, per week) **INTERNATIONAL** *Multiple Industrial Countries*: Gershuny & Sullivan 2003:215
No signif. difference	
Women more	

11.3.3.5. Hours Worked Per Day Both Inside and Outside the Home Combined

Despite the evidence that males work more hours per day or week specifically for pay than do females (see above table), when unpaid work is included, females appear to work more than males (Table 11.3.3.5).

Table 11.3.3.5. Hours worked per day both inside and outside the home combined.

Nature of Any Difference	Postpubertal
	Adult
Males more	
No signif. difference	**NORTH AMERICA** *United States*: Milkie & Peltola 1999 (work/family balance)
Females more	**EUROPE** *Greece*: Safilios-Rothschild 1970 **NORTH AMERICA** *United States*: Myrdal & Klein 1956; Blood & Hamblin 1958; Blood & Wolfe 1960; Nye & Hoffman 1963

11.3.3.6. Experience Conflict between Family and Work Responsibilities

Several studies indicate that women experience greater conflict between demands from their work and those from their family responsibilities than do men (Table 11.3.3.6).

Table 11.3.3.6. Experience conflict between family and work responsibilities.

Nature of Any Difference	Postpubertal
	Adult
Males more	
No signif. difference	
Females more	**NORTH AMERICA** *United States*: Gutek et al. 1991; CA Thompson & Blau 1993; Greenhaus et al. 1997; Milkie & Peltola 1999; Keene & Quadagno 2004

11.3.4. Basic Characteristics of Jobs and Occupations

Different occupations are sometimes more attractive to one sex more than the other because of the nature of the job. Research findings concerning the types of characteristics that men and women are most likely to gravitate toward are presented below.

11.3.4.1. Occupations Requiring Strength and Physical Exertion

Several studies suggest that males gravitate more than females do toward occupations requiring substantial physical strength and exertion (Table 11.3.4.1).

Table 11.3.4.1. Occupations requiring strength and physical exertion.

Nature of Any Difference						Postpubertal	
						Adult	
Males more						**ASIA** *Japan*: Kawakami et al. 2004:209 (full time workers) **NORTH AMERICA** *United States*: C Russell & Russell 1971:68; GB Lewis & Nice 1994 (government workers); W Miller et al. 1999:222 (government workers); Elesh 2002:323 (manual laborers); B Kerr et al. 2002 **OCEANIA** *Philippines*: Estudillo et al. 2001b:31 (rural)	
No signif. difference							
Females more							

11.3.4.2. Hazardous Occupations (Dangerous Work)

Research has shown that males are more likely to engage in occupations with greater risks of bodily harm than is true for females (Table 11.3.4.2). The nature of these risks often involves being subjected to high rates of accidental injuries and even death (such as mining, deep-sea crab fishing, and heavy construction jobs), and other times involves risks of being intentionally maimed or killed (such as in combat) (Ecuyer-Dab & Robert 2004:229).

Table 11.3.4.2. Hazardous occupations (dangerous work).

Nature of Any Difference							Multiple Age Categories
Males more							**NORTH AMERICA** *United States*: Seccombe 1993:564; Breslau et al. 1999:816
No signif. difference							
Females more							

11.3.5. Basic Types of Occupations

Many studies have compared the prevalence of males and females in various types of occupations. The results of these studies are summarized below.

11.3.5.1. Masculine Occupations (Male Sex-Typical Occupations)

Central to describing masculine occupations is that they usually involve dealing more with manipulating things (other than food) or with organizational hierarchies rather than with interpersonal relationships (the latter being more of the focus of occupations in which females tend to be concentrated). As shown in Table 11.3.5.1, all available studies indicate that males are more involved in masculine occupations than are females.

Table 11.3.5.1. Masculine occupations (male sex-typical occupations).

Nature of Any Difference					Postpubertal		
						Adult	
Males more						**ASIA** *Korea*: Jin & Stevens 1987 **EUROPE** *Britain*: PW Miller 1987 (substantial occupational segregation by sex); L Blackwell 2001; *Germany*: Blossfeld 1987; Trappe & Rosenfeld 2004:170; *Sweden*: Jonung 1997; *Switzerland*: Charles & Buchmann 1994; JH Li et al. 1998 **NORTH AMERICA** *Canada*: H Armstrong & Armstrong 1975; Reskin & Roos 1990; Tomaskovic-Devey 1993; JP Jacobsen 1994; *United States*: England 1981; Polachek 1981; P England 1982; Bielby & Baron 1984; Marini & Brinton 1984; Roos & Reskin 1984; Albelda 1986; Bianchi & Rytina 1986 (lesser degree than in past); Bielby & Baron 1986; Lyson 1986*; Hollenbeck et al. 1987; E Sorensen 1989; JA Jacobs 1989; MC King 1992; Bianchi 1995 (lesser degree than in past); DA Cotter et al. 1995 (lesser degree than in past); Reskin & Cassirer 1996; Tam 1997; Blau et al. 1998; Lippa 1998; RL Nelson & Bridges 1999; Okamoto & England 1999; Lubinski et al. 2000 (among gifted students); R Wright & Ellis 2000; Baunach 2002 **OCEANIA** *Australia*: FL Jones 1983 (substantial occupational segregation by sex with very little change 1911 to 1976); Karmel & MacLachlam 1988 (occupational segregation by sex); O'Donnell & Hall 1988; Rimmer 1991 (occupational segregation by sex); Australian Bureau of Statistics 1993; M Kidd 1993:49 (males over-represented admin. & manual labor; females excess in professional & clerical); *New Zealand*: Lyson 1986* **INTERNATIONAL** *Multiple Countries*: JA Jacobs & Lim 1992:465; *Several Industrial Societies*: PA Roos 1985	
No signif. difference							
Females more							

11.3.5.2. Feminine Occupations (Feminine Sex-Typical Occupations)

As with males tending to dominate in masculine occupations, all studies have consistently shown that females dominate in feminine occupations (Table 11.3.5.2).

Table 11.3.5.2. Feminine occupations (female sex-typical occupations)

Nature of Any Difference					Postpubertal		Multiple Age Categories
						Adult	
Males more							
No signif. difference							
Females more						**EUROPE** *Britain*: Hakim 1992; Nordli-Hansen 1995*; *Norway*: Nordli-Hansen 1995*; *Sweden*: Jonung 1984; Aberg 1987; Jonung 1993; Nermo 1994 **MIDDLE EAST** *Israel*: Wittig & Berman 1992 **NORTH AMERICA** *United States*: V Oppenheimer 1970; D Snyder et al. 1978; P England 1981; Bielby & Baron 1986 (women work in more feminine occupations); Hollenbeck et al. 1987; JA Jacobs 1989; D Moore 1992; Cotter et al. 1997 (women work in more feminine occupations); O'Neil 2003:311 (survey data) **OCEANIA** *Australia*: M Kidd 1993 **INTERNATIONAL** *Multiple Countries*: JA Jacobs & Lim 1992; M Charles & Grusky 1995	**LATIN AMERICA** *Guatemala*: Chinchilla 1977; *Mexico*: Arizpe 1977 **NORTH AMERICA** *United States*: Marini & Brinton 1984

11.3.5.3. Sex Segregation of Occupations

Studies that have assessed occupations in terms of their degree of sex segregation have found it to be greater in occupations dominated by women than by those dominated by men (Table 11.3.5.3). These findings concur with the generalization reached by Reskin (1993).

Table 11.3.5.3. Sex segregation of occupations.

Nature of Any Difference	Citations
Male occupations more	**NORTH AMERICA** *United States*: WP Bridges 1982; JN Baron & Bielby 1985; KB Ward & Mueller 1985; PA Taylor et al. 1986; Seccombe 1993:564
No signif. difference	
Female occupations more	

11.3.5.4. Trends in Sex Segregation of Occupations

The available research regarding the extent to which males and females fill sex segregated occupations have concluded that virtually no changes were evident prior to the 1970s, at which time there has been a very modest decrease in this segregation. Reflecting the extent to which males and females still tend to gravitate toward different occupations, researchers have estimated that over half of one sex would have to change jobs for sexual equality in occupations to be realized (Blau & Hendricks 1979, FL Jones 1983) (Table 11.3.5.4).

Table 11.3.5.4. Trends in sex segregation of occupations.

Nature of Any Difference	Citations
Increase in the sex difference	
No signif. change	**OCEANIA** *Australia*: FL Jones 1983 (1900-1980)
Decrease in the sex difference	**NORTH AMERICA** *United States*: Lyson 1981 (1970s); Reskin 1993 (1970-1990); Beller 1984 (throughout 1970s); JA Jacobs 1985 (1970-1982); Bianchi & Rytina 1986 (1970-1983); JA Jacobs 1989 (170-1985); JP Jacobsen 1994 (1970-1990); Bianchi 1995 (1970s & 1980s); DA Cotter et al. 1995 (1970-1990) **OCEANIA** *Australia*: Karmel & MacLachlan 1988 (1970-1985); Rimmer 1991 (1970-1988)

11.3.5.5. Self-Employment

The available evidence is consistent with the conclusion that males are more likely than females to be self-employed (Table 11.3.5.5).

Table 11.3.5.5. Self-employment.

Nature of Any Difference	Postpubertal		Multiple Age Categories
		Adult	
Males more		**NORTH AMERICA** *Canada*: M Denton et al. 2004:2591	**ASIA** *Hong Kong*: Fan & Lui 2003:615 **NORTH AMERICA** *United States*: Reskin & Ross 1992:350
No signif. difference			
Females more			

11.3.5.6. Occupational Prestige

In all complex societies, occupations are recognized as having varying levels of prestige. Occupations that require a great deal of skill, decision-making responsibility, and/or control over others usually receive the highest prestige rankings.

Studies undertaken to determine if employed males or females hold more prestigious occupations have come to somewhat inconsistent conclusions, with most studies suggesting that the jobs held by men are more prestigious than those held by women (Table 11.3.5.6). Part of the reason for the inconsistency is that males typically hold more manual labor (blue collar) occupations than do females. Such occupations are usually considered lower in prestige and are less skilled than clerical (white collar) occupations (which females are more likely to hold).

Table 11.3.5.6. Occupational prestige.

Nature of Any Difference	Citations
Males more	**EUROPE** *Britain*: Savage 1992 **NORTH AMERICA** *Canada*: Chaykowski 1994 (manufacturing); *United States*: US Civil Service Commission 1968:3; Francesco & Hakel 1981; Rytina & Bianchi 1984:11; Rhode 1988; Medwechuk & Crossman 1994:163; US Department of Labor 2001 **OCEANIA** *Fiji*: Brison 1999 **INTERNATIONAL** *Multiple Countries*: Passow et al. 1976
No signif. Difference	**NORTH AMERICA** *Canada*: J Fox & Suschnigg 1989; *United States*: H Sanborn 1964; D Treiman & Terrell 1975; Featherman & Hauser 1976; McClendon 1976; Spaeth 1977 (college graduates); Brown et al. 1980a; Seccombe 1993:564
Females more	**MIDDLE EAST** *Israel*: Semyonov & Lewin-Epstein 1994:57 (full-time workers)

11.3.5.7. Jobs Involving Managerial/Administrative/Supervisory Responsibilities or Control

In Table 11.3.5.7, studies have consistently shown that in all occupational categories yet investigated, greater proportions of male workers hold managerial positions than do female workers. The differences are especially pronounced in the case of top management positions such as administrators of large institutions or corporate executives (Oakley 2000).

Table 11.3.5.7. Jobs involving managerial/administrative/supervisory responsibilities or control.

Nature of Any Difference	Citations
Proportionally more males	**AFRICA** *Nigeria*: KE Payne & Cangemi 1997 (leaders in public life) **ASIA** *Soviet Union*: JS Schwartz 1979; Yanowitch 1987:352 **EUROPE** *Sweden*: Thorsell 1967; Karasek et al. 1981 **MIDDLE EAST** *Israel*: Zak & Horowitz 1985 (education); Rosner & Shur 1987; Izraeli 1997; Addi-Raccah & Ayalon 2002 (education) **NORTH AMERICA** *Canada*: M Boyd et al. 1991; S Acker 1994 (education); Roxburgh 1996; M Denton et al. 2004:2591 (supervisor); *United States*: Lortie 1975 (education); Renwick & Tosi 1978; LK Brown 1979; WC Wolf & Fligstein 1979a; WC Wolf & Fligstein 1979b; Wilensky & Lawrence 1979; Hittman 1980; P England et al. 1982 (in their jobs); Rytina & Bianchi 1984:15; JN Baron et al. 1986; GB Lewis & Emmert 1986 (government); US Bureau of the Census 1986:Table 677; Vetter & Babco 1986:75; DiPrete & Soule 1988; Ortiz & Marshall 1988 (education); BF Reskin 1988; Calabrese & Ellsworth 1989 (secondary education); Fierman 1990; BF Reskin & Roos 1990; DJ Schuster & Foote 1990 (secondary education); US Bureau of the Census 1992a (marketing and advertising); JA Jacobs 1992; BF Reskin & Ross 1992:343; MA Adler 1993:455; C Bell & Chase 1993 (education); Ibarra 1993; GN Powell 1993; Seccombe 1993:564; US Bureau of the Census 1993; AM Adler 1994; GB Lewis & Nice 1994 (government); Naff & Thomas 1994 (government); National Center for Education Statistics 1994 (school principals); MA Newman 1994 (government); Rosenblatt 1995; BF Reskin & Ross 1995; US Bureau of the Census 1995:Table 649; Bickley 1996; Catalyst 1996; Dobrsynski 1996; Ibarra 1997; Mani 1997 (government); BH Wootten 1997; L Joy 1998 (primary education); Hutlin & Szulkin 1999 (government); Maume 1999; Kinsella & Velkoff 2001:104 **INTERNATIONAL** *Multiple Countries*: D'Amico 1986; *Several Industrialized Countries*: NJ Adler 1993; International Labour Office 1996; *Several Western Countries*: Schmuck 1987
No signif. difference	
Proportionally more females	

11.3.5.8. Autocratic (Less Democratic) Management Style

A few studies have compared the sexes with respect to how they manage employees within the context of a business. The conclusion from these studies is either that males are more autocratic or that there are essentially no sex differences (Table 11.3.5.8).

Table 11.3.5.8. Autocratic (less democratic) management style.

Nature of Any Difference	Citation
Males more	**NORTH AMERICA** *Canada*: Korabik et al. 1993* (college, role playing study); *United States*: Jago & Vroom 1982 (autocratic style)
No signif. difference	**NORTH AMERICA** *Canada*: Korabik et al. 1993* (full adults, actual manager); *United States*: Sitt et al. 1983 (college)
Females more	

11.3.5.9. Autonomous Control Over Work Responsibilities

A study among full-time workers found that males had greater autonomous control over the type of work they would perform than was the case for females (Table 11.3.5.9).

Table 11.3.5.9. Autonomous control over work responsibilities.

Nature of Any Difference	Citation
Males more	**EUROPE** *Britain*: Marmot & Davey Smith 1997
No signif. difference	
Females more	

11.3.5.10. Entrepreneurial Activities in General

The one available study on entrepreneurial activities pertained to investing in the stock market. It indicated that males were more inclined to do so than females (Table 11.3.5.10).

Table 11.3.5.10. Entrepreneurial activities in general.

Nature of Any Difference					Multiple Age Categories
Males more					**NORTH AMERICA** *United States*: BM Barber & Odean 2001:275 (investing in stock market)
No signif. difference					
Females more					

11.3.5.11. Political Involvement in General

Several social scientists have maintained that in all societies men hold greater political power than do women (Rosaldo 1974:21; Whyte 1978; Low 1990; Goldberg 1993). This generalization is consistent with studies cited in Table 11.3.5.11, indicating that males are more involved in political affairs (variously measured) than are females.

Table 11.3.5.11. Political involvement in general.

Nature of Any Difference	Citations
Males more	**EUROPE** *China*: MK Jennings 1998:959 (grassroots); *Hungary*: Fodor 2002 (communist era) **MIDDLE EAST** *India*: Tenhunen 2003 **NORTH AMERICA** *United States*: K Andersen 1975:442 (support work for political campaigns); Schlozman et al. 1994
No signif. difference	
Females more	

11.3.5.12. Occupations Involving Physical Manipulations

Occupations involving physical manipulations primarily consist of construction and craft work. The available research has indicated that males are more involved in occupations which entail the manipulation of tangible objects (Table 11.3.5.12).

Table 11.3.5.12. Occupations involving physical manipulations.

Nature of Any Difference	Postpubertal	
	Adolescent	Adult
Males more	**EUROPE** *England*: J Pratt et al. 1984*; *Scotland*: Ryrie et al. 1979*	**EUROPE** *England*: J Pratt et al. 1984*; *Scotland*: Ryrie et al. 1979*
No signif. difference		
Females more		

11.3.5.13. Organizational/Company Size in Which One Is Employed

Do the companies people work for have more employees in the case of males or females? According to one study of full-time workers, males were employed by larger firms than were females (Table 11.3.5.13).

Table 11.3.5.13. Organizational/company size in which one is employed.

Nature of Any Difference	Citation
Males larger	**NORTH AMERICA** *United States*: Seccombe 1993:564
No signif. difference	
Females larger	

11.3.5.14. Helping Occupations

Two studies were located that indicated that females were more prevalent in so-called helping occuations than were males (Table 11.3.5.14). These occupations typically are not-for-profit and encompass such fields as education, health care, social work, and counseling.

Table 11.3.5.14. Helping occupations.

Nature of Any Difference	Postpubertal
	Adult
Males more	
No signif. difference	
Females more	**EUROPE** *Britain*: Hakim 1979; Hakim 1996

11.3.5.15. Service Occupations

Service occupations are those that focus on dealing with and assisting others, usually in profit-making capacities. As indicated in Table 11.3.5.15, the available evidence suggests that females are more likely than males to be involved in such occupations.

Table 11.3.5.15. Service occupations.

Nature of Any Difference	Postpubertal		Multiple Age Categories
		Adult	
Males more			
No signif. difference			
Females more		**NORTH AMERICA** *United States*: Leicht & Marx 1997; Witkowski & Leicht 1995 **OCEANIA** *Philippines*: Lim 2000 (from 1987 through 1998)	**EUROPE** *Spain*: Romero Lopez 1990; Lazaro & Sanchez 1993; Molto Carbonell 1993

11.3.5.16. Hunting Forms of Predation

Hunting forms of predation involves stalking or lying in ambush and then killing members of animal species other than one's own. Usually, predatory behavior is followed by at least partial consumption of the prey. These studies have found no sex differences in such behavior.

Hunting is a special type of predatory behavior that is often carried out in cooperation with familiar conspecifics (members of one's own species). Most hunting entails extensive tracking of prey, and then quickly inflicting lethal injury on the prey when spotted before they have a chance to escape. Among humans, hunting typically involves the use of projectile weapons such as spears, bows and arrows, and guns.

In extensive surveys of ethnographic accounts of hunting, males were found to predominate in hunting in nearly all societies. Interestingly, male domination in hunting has also been found by observers of wild chimpanzees. The typical prey of chimpanzee hunters is young monkeys and bush pigs, and their method of killing usually involves flailing the pray against a tree limb or on the ground. Overall, Table 11.3.5.16 suggests that at least in chimpanzees and nearly all societies of humans, males are more involved in hunting than females.

Table 11.3.5.16. Hunting forms of predation.

Nature of Any Difference					Postpubertal		
						Adult	
Males more						**NORTH AMERICA** *United States*: J Spector 1983 (Hidatsa); CP Flynn 2002:141 (college, self-report) **INTERNATIONAL** *Multiple Societies*: C Russell & Russell 1971:68 (166/166 human societies); *Multiple Preliterate Societies*: Murdock & Provost 1973:207* (large aquatic fauna, 48/48); Murdock & Provost 1973:207* (large land fauna,144/144); Murdock & Provost 1973:207* (fowling, 136/139) **APE** *Chimpanzee*: Teleki 1973; Kawanaka 1982; Goodall 1986; Boesch & Boesch 1989; Uehara et al. 1992; Stanford et al. 1994; Mitani & Watts 1999:449	
No signif. difference						**INTERNATIONAL** *Multiple Preliterate Societies*: Murdock & Provost 1973:207* (fowling, 3/139)	
Females more							

11.3.5.17. Predation Other Than Hunting

Many animals engage in aggression toward (and kill) animals not of their own species using methods other than hunting (a primary component of which involved tracking and stalking one's prey prior to its being killed). As shown in Table 11.3.5.17, the findings have been mixed with respect to significant gender differences in non-hunting forms of predation.

Table 11.3.5.17. Predation other than hunting.

Nature of Any Difference					Postpubertal		Multiple Age Categories
						Adult	
Males more							**PRIMATE (EXCEPT APE)** *Olive Baboon*: Harding 1973; Harding & Strum 1976
No signif. difference						**RODENT** *Rat*: Karli 1956 (mouse-killing); Karli et al. 1969 (young)	**PRIMATE (EXCEPT APE)** *Marmoset*: Bugnyar & Huber 1997
Females more						**ARACHNID** *Wolf Spider*: SE Walker & Rypstra 2001 (attacks & consumes more prey); SE Walker & Rypstra 2001 (attacks & consumes more prey)	**APE** *Chimpanzee*: Hiraiwa-Hasegawa 1989 (ant fishing); Lonsdorf 2005 (termite fishing) **PRIMATE (EXCEPT APE)** *Stumptail Macaque*: Estrada et al. 1978

11.3.5.18. Foraging and Gathering Behavior

Sex differences in foraging for and gathering plant material to eat have been investigated in many societies. As shown in Table 11.3.5.18, the evidence that such behavior is more common in one sex than the other is quite mixed.

Table 11.3.5.18. Foraging and gathering behavior.

Nature of Any Difference							Multiple Age Categories
Males more							**AFRICA** *Tanzania*: Marlowe 2001; Marlowe 2003:219 **INTERNATIONAL** *Multiple Preliterate Societies*: Murdock & Provost 1973:207* (collection of wild honey, 44/48); Murdock & Provost 1973:207* (small land fauna, 30/67); Murdock & Provost 1973:207* (small aquatic fauna, 15/55); Murdock & Provost 1973:207* (wild vegetal foods 10/135) **BIRD** *Snail Kite*: Beissinger 1987:497
No signif. difference							**INTERNATIONAL** *Multiple Preliterate Societies*: Murdock & Provost 1973:207* (collection of wild honey, 2/48); Murdock & Provost 1973:207* (small land fauna, 9/67); Murdock & Provost 1973:207* (small aquatic fauna, 1/55); Murdock & Provost 1973:207* (wild vegetal foods 18/135)
Females more							**AFRICA** *South Africa*: Silberbauer 1981 (Kalaharai desert tribe) **LATIN AMERICA** *Columbia*: AC Roosevelt 1998 (hunter-gatherers) **OCEANIA** *Australia*: RA Gould 1981 (tribal people) **INTERNATIONAL** *Multiple Preliterate Societies*: Murdock & Provost 1973:207* (collection of wild honey, 2/48); Murdock & Provost 1973:207* (small land fauna, 28/67); Murdock & Provost 1973:207* (small aquatic fauna, 39/55); Murdock & Provost 1973:207* (wild vegetal foods 107/135)

11.3.5.19. Crop Cultivation

One study of persons who were most often involved in crop cultivation concluded that women did so to a greater extent than men (Table 11.3.5.19).

Table 11.3.5.19. Crop cultivation.

Nature of Any Difference	Postpubertal		
		Adult	
Males more			
No signif. difference			
Females more		**LATIN AMERICA** *Columbia*: Hames & Vickers 1983 (Amazonian horticulturalists)	

11.3.5.20. Herding

Herding entails following, watching, and directing the movement of non-conspecific animals. Humans nearly always direct herding behavior toward species of ungulates (hoofed animals) such as cattle, sheep, horses, and deer. The ethnographic research on sex differences was summarized in the early 1970s, and found to be universally more common among males than among females (Table 11.3.5.20).

Table 11.3.5.20. Herding.

Nature of Any Difference							Multiple Age Categories
Males more							**INTERNATIONAL** *Multiple Societies*: C Russell & Russell 1971:68 (38/38 human societies); *Multiple Preliterate Societies*: Murdock & Provost 1973:207* (78/98)
No signif. difference							**INTERNATIONAL** *Multiple Preliterate Societies*: Murdock & Provost 1973:207* (14/98)
Females more							**OCEANIA** *New Guinea*: Sillitoe 2001:177 (herding pigs) **INTERNATIONAL** *Multiple Preliterate Societies*: Murdock & Provost 1973:207* (6/98)

11.3.5.21. Metallurgy

Metallurgy refers to the working of metals. This usually involves melting the metal and separating it from the ore in which it was embedded. Studies have consistently found that most metallurgists in all known societies where such work is performed are males (Table 11.3.5.21).

Table 11.3.5.21. Metallurgy.

Nature of Any Difference	Postpubertal	Multiple Age Categories
	Adult	
Males more	**NORTH AMERICA** *United States*: Rytina & Bianchi 1984:15 (welding) **INTERNATIONAL** *Multiple Preliterate Societies*: Murdock & Provost 1973:207* (smelting of ores, 37/37); Murdock & Provost 1973:207* (metalworking, 86/86)	**INTERNATIONAL** *Multiple Societies*: C Russell & Russell 1971:68 (78/78)
No signif. difference		
Females more		

11.3.6. Work in Specific Occupations or Occupational Areas

Many studies have been conducted to assess the proportion of workers according to sex in various occupations who are males and females. This section provides a summary of what these studies have concluded.

11.3.6.1. Diversity (Variability) in Occupations

According to limited research, males are engaged in a greater range of occupations than is true for females (Table 11.3.6.1).

Table 11.3.6.1. Diversity (variability) in occupations.

Nature of Any Difference	Postpubertal
	Adult
Males more	**NORTH AMERICA** *United States*: Blau & Hendricks 1979; US Bureau of the Census 1980; JA Jacobs 1989; Dunn 1996
No signif. difference	
Females more	

11.3.6.2. Accounting

The available research has provided an inconsistent picture with respect to any gender difference in persons who become accountants (Table 11.3.6.2).

Table 11.3.6.2. Accounting.

Nature of Any Difference	Postpubertal
	Adult
Males more	**EUROPE** *Britain*: Crompton & Sanderson 1990
No signif. difference	**MIDDLE EAST** *Israel*: Israel Central Bureau of Statistics 1997
Females more	**NORTH AMERICA** *United States*: PN Cohen 2004:247 (bookkeeper)

11.3.6.3. Administration

Administrative occupations in the field of education appear to be filled by more males than females. However, in other fields, the opposite may be true (Table 11.3.6.3).

Table 11.3.6.3. Administration.

Nature of Any Difference	Postpubertal
	Adult
Males more	**AFRICA** *South Africa*: Chisholm & Unterhalter 1999 (educational) **NORTH AMERICA** *United States*: National Education Association 1973 (elementary school principals); Tallerico 1997 (educational)
No signif. difference	
Females more	**MIDDLE EAST** *Egypt*: Arabsheibani 1990 **NORTH AMERICA** *United States*: PN Cohen 2004:247

11.3.6.4. Agriculture

Agricultural occupations primarily involve farming. As shown in Table 11.3.6.4, a couple of studies have concluded that males are more involved in agriculture than are females.

Table 11.3.6.4. Agriculture.

Nature of Any Difference	Postpubertal	Multiple Age Categories
	Adult	
Males more	**NORTH AMERICA** *Canada*: P Smith 1992; *United States*: Kinsella & Velkoff 2001:104 **OCEANIA** *Philippines*: Lim 2000 (from 1987 through 1998)	**NORTH AMERICA** *United* States: Vetter & Babco 1986:75
No signif. difference		
Females more		

11.3.6.5. Architecture

The two available studies on gender differences among architects both concluded that greater proportions are males than females (Table 11.3.6.5).

Table 11.3.6.5. Architecture.

Nature of Any Difference	Postpubertal	Multiple Age Categories
	Adult	
Males more	**NORTH AMERICA** *United States*: Rytina & Bianchi 1984:15	**NORTH AMERICA** *United States*: US Bureau of the Census 1992
No signif. difference		
Females more		

11.3.6.6. Artisan/Skilled Craft Maker

All of the studies that have compared the sexes regarding the occupation of artisan or skilled craftsperson, have indicated that males were more prevalent in those occupations than females (Table 11.3.6.6).

Table 11.3.6.6. Artisan/skilled craft maker.

Nature of Any Difference	Postpubertal
	Adult
Males more	**ASIA** *Japan*: Kawakami et al. 2004:209 (full time workers) **NORTH AMERICA** *Canada*: M Denton et al. 2004:2591; *United States*: Vetter & Babco 1986:76 (manufacture & repairs)
No signif. difference	
Females more	

11.3.6.7. Auto Mechanic

The research cited in Table 11.3.6.7 indicates that more males than females are automobile mechanics.

Table 11.3.6.7. Auto mechanic.

Nature of Any Difference	Postpubertal	Multiple Age Categories
	Adult	
Males more	**MIDDLE EAST** *Israel*: Israel Central Bureau of Statistics 1997 (mechanics) **NORTH AMERICA** *United States*: Rytina & Bianchi 1984:15	**NORTH AMERICA** *United States*: Vetter & Babco 1986
No signif. difference		
Females more		

11.3.6.8. Banking

The one study on banking concluded that greater proportions of males than females were involved in this area of commerce (Table 11.3.6.8).

Table 11.3.6.8. Banking.

Nature of Any Difference	Postpubertal
	Adult
Males more	**MIDDLE EAST** *Kuwait*: Metle 2001:318
No signif. Difference	
Females more	

11.3.6.9. Biologist

According to the two available studies, more males than females are classified as biologists, although a third study reached the opposite conclusion (Table 11.3.6.9).

Table 11.3.6.9. Biologist.

Nature of Any Difference	Postpubertal	Multiple Age Categories
	Adult	
Males more	**NORTH AMERICA** *United States*: AS Rossi 1965	**NORTH AMERICA** *United States*: RH Hall 1969:334
No signif. Difference		
Females more	**MIDDLE EAST** *Israel*: Israel Bureau of Statistics 1997	

11.3.6.10. Bus Driver

The one available study of the sex ratio among bus drivers concluded that males exceeded females in this occupation (Table 11.3.6.10).

Table 11.3.6.10. Bus driver

Nature of Any Difference	Postpubertal
	Adult
Males more	**MIDDLE EAST** *Israel*: Israel Bureau of Statistics 1997
No signif. Difference	
Females more	

11.3.6.11. Butcher

According to the available research, more males than females are involved in butchering in most societies (Table 11.3.6.11).

Table 11.3.6.11. Butcher.

Nature of Any Difference	Postpubertal
	Adult
Males more	**EUROPE** *Sweden*: Sundin 2001:101 (87%) **INTERNATIONAL** *Multiple Preliterate Societies*: Murdock & Provost 1973:207* (131/143)
No signif. Difference	**INTERNATIONAL** *Multiple Preliterate Societies*: Murdock & Provost 1973:207* (4/143)
Females more	**INTERNATIONAL** *Multiple Preliterate Societies*: Murdock & Provost 1973:207* (8/143)

11.3.6.12. Chemist

The one study located with reference to gender differences among chemists concluded that more males than females were in this profession (Table 11.3.6.12).

Table 11.3.6.12. Chemist.

Nature of Any Difference	Multiple Age Categories
Males more	**NORTH AMERICA** *United States*: RH Hall 1969:334
No signif. difference	
Females more	

11.3.6.13. Childcare/Daycare Provider

Those who provide childcare to children are more likely to be females than males according to pertinent studies that were located (Table 11.3.6.13).

Table 11.3.6.13. Childcare/daycare provider.

Nature of Any Difference							Multiple Age Categories
					Postpubertal		
						Adult	
Males more							
No signif. difference							
Females more						**MIDDLE EAST** *Israel*: Israel Central Bureau of Statistics 1997 **NORTH AMERICA** *United States*: Rytina & Bianchi 1984:16	**NORTH AMERICA** *United States*: Vetter & Babco 1986

11.3.6.14. Clergy/Ministry

All of the available research indicates that more males than females are members of the clergy or religious ministry (Table 11.3.6.14).

Table 11.3.6.14. Clergy/minister.

Nature of Any Difference							Multiple Age Categories
					Postpubertal		
						Adult	
Males more						**NORTH AMERICA** *United States*: Proctor & Proctor 1976; RL Phillips et al. 1980 (Seventh Day Adventists); Lawless 1988; House 1990	**NORTH AMERICA** *United States*: RH Hall 1969:334
No signif. difference							
Females more							

11.3.6.15. Clerical/Service Occupations

Clerical and service occupations include those who function as personal secretaries and receptionists as well as those who perform basic recordkeeping and budgeting for a business or organization. According to the available research, females are more often involved in these occupations than are males (Table 11.3.6.15).

Table 11.3.6.15. Clerical/service occupations.

Nature of Any Difference							Multiple Age Categories
					Postpubertal		
						Adult	
Males more							
No signif. difference							
Females more						**ASIA** *Japan*: Kawakami et al. 2004:209 (full time workers) **EUROPE** *Britain*: CM Cassel & Walsh 1993 **LATIN AMERICA** *Brazil*: Htun 1999:137 (secretary/receptionist) **NORTH AMERICA** *Canada*: M Denton et al. 2004:2591; *United States*: Rytina & Bianchi 1984:16; Kinsella & Velkoff 2001:104; PN Cohen 2004:247 (cashier)	**MIDDLE EAST** *Israel*: Israel Central Bureau of Statistics 1997 (office workers) **NORTH AMERICA** *United States*: Vetter & Babco 1986:75 (secretary/receptionist)

11.3.6.16. Computer-Related Occupations

Computer-related occupations primarily include programmers and hardware technicians. As indicated in Table 11.3.6.16, one study suggested that males are more involved in such occupations than are females.

Table 11.3.6.16. Computer-related occupations.

Nature of Any Difference							Multiple Age Categories
Males more							**NORTH AMERICA** *United States*: R Wright & Jacobs 1994:529
No signif. difference							
Females more							

11.3.6.17. Construction/Carpentry Occupations

According to one study, males are more involved in construction occupations than are females (Table 11.3.6.17).

Table 11.3.6.17. Construction/carpentry occupations.

Nature of Any Difference					Postpubertal		
						Adult	
Males more						**NORTH AMERICA** *United States*: Rytina & Bianchi 1984:15 (machine operators) **OCEANIA** *Philippines*: Lim 2000 (from 1987 through 1998) **INTERNATIONAL** *Multiple Preliterate Societies*: Murdock & Provost 1973:207* (work in wood, 162/164); Murdock & Provost 1973:207* (lumbering, 139/139); Murdock & Provost 1973:207* (boat building, 87/91); Murdock & Provost 1973:207* (house building, 135/178)	
No signif. difference						**INTERNATIONAL** *Multiple Preliterate Societies*: Murdock & Provost 1973:207* (work in wood, 1/164); Murdock & Provost 1973:207* (boat building 3/91); Murdock & Provost 1973:207* (house building, 14/178)	
Females more						**INTERNATIONAL** *Multiple Preliterate Societies*: Murdock & Provost 1973:207* (work in wood, 1/164); Murdock & Provost 1973:207* (house building, 29/178)	

11.3.6.18. Cooks/Chefs

The one study of cooks and chefs failed to find a significant gender difference in this occupation (Table 11.3.6.18).

Table 11.3.6.18. Cooks/chefs.

Nature of Any Difference					Postpubertal		
						Adult	
Males more							
No signif. difference						**NORTH AMERICA** *United States*: PN Cohen 2004:247	
Females more							

11.3.6.19. Corporate Executive Officer (CEO)/Manager

Studies have unanimously agreed that men are more likely than women to be corporate executive officers and managers (Table 11.3.6.19).

Table 11.3.6.19. Corporate executive officer (CEO)/manager.

Nature of Any Difference					Postpubertal		
						Adult	
Males more						**EUROPE** *Britain*: Tancred-Sheriff & Campbell 1992 (manager); CM Cassel 1993; JG Oakley 2000 (managerial); *Norway*: Kvande & Rasmussen 1991 **NORTH AMERICA** *Canada*: M Denton et al. 2004:2591 (supervisor); *United States*: Kanter 1977 (manager); Hambrick & Mason 1984; Fierman 1990 (manager); TH Cox & Harquail 1991 (among MBAs, manager); Federal Glass Ceiling Commission 1995 (manager); Schneer & Reitman 1995 (manager); Ragins et al. 1998; Daily et al. 1999 (executive officers); US Department of Labor 2001 (manager, 55% with liberal definition) **INTERNATIONAL** *Multiple Countries*: Daily & Near 2000	
No signif. difference							
Females more							

11.3.6.20. Counselor/Psychotherapist

One study was located that compared the sexes with respect to their being counselors and psychotherapists. Males were found to have been more involved in these types of professions than were females (Table 11.3.6.20).

Table 11.3.6.20. Counselor/psychotherapist.

Nature of Any Difference							Multiple Age Categories
Males more							**NORTH AMERICA** *United States*: Chesler 1971
No signif. difference							
Females more							**MIDDLE EAST** *Israel*: Israel Central Bureau of Statistics 1997

11.3.6.21. Creative Writing and Producing

Several studies have assessed gender differences in the writing and producing of plays, television programs, and the like. These studies have all concluded that males are more directly involved in these endeavors than are females (Table 11.3.6.21).

Table 11.3.6.21. Creative writing and producing.

Nature of Any Difference					Postpubertal
					Adult
Males more					**EUROPE** *Britain*: JR Taylor 1962:212 (playwrights); Shubik 1975 (playwrights); MacMurraugh-Kavanagh 1999 (playwrights) **NORTH AMERICA** *United States*: Lauzen & Dozier 1999 (television directors/writers/producers/executives); Glascock 2001:661 (television directors/writers/producers/executives)
No signif. difference					
Females more					

11.3.6.22. Dentistry

According to two studies, more dentists are males than females. However, dental hygienists who often assist dentists in the routine cleaning of teeth are more often female according to one additional study (Table 11.3.6.22).

Table 11.3.6.22. Dentistry.

Nature of Any Difference					Postpubertal	Multiple Age Categories
					Adult	
Males more					**NORTH AMERICA** *United States*: RH Hall 1969:334 (dentist); US Bureau of the Census 1992 (dentist)	
No signif. difference						
Females more						**NORTH AMERICA** *United States*: Vetter & Babco 1986 (dental hygienist)

11.3.6.23. Editor

The one study of sex differences among journal editors found more males than females performing this occupational function (Table 11.3.6.23).

Table 11.3.6.23. Editor.

Nature of Any Difference					Postpubertal
					Adult
Males more					**NORTH AMERICA** *United States*: J Keiser et al. 2003 (on boards of medical journals)
No signif. difference					
Females more					

11.3.6.24. Engineer

The available research has consistently found more engineers to be males rather than females (Table 11.3.6.24).

Table 11.3.6.24. Engineer.

Nature of Any Difference					Postpubertal
					Adult
Males more					**MIDDLE EAST** *Israel*: Israel Central Bureau of Statistics 1997 (aeronautics) **NORTH AMERICA** *United States*: FD Blau 1979:277; Lawler 2002 (professor)
No signif. difference					
Females more					

11.3.6.25. Entrepreneur (Profit Making/Business Owners Occupation)

Entrepreneurs are persons who take business risks for the opportunity to make a profit. All of the available research has concluded that more males take up entrepreneurial ventures than do females (Table 11.3.6.25).

Table 11.3.6.25. Entrepreneur (profit making/business owners occupation).

Nature of Any Difference					Postpubertal		Multiple Age Categories
						Adult	
Males more						**ASIA** *China*: Entwisle et al. 1995 **NORTH AMERICA** *United States*: FD Blau 1979:277; Birch 1992; D Carr 1996	**ASIA** *China*: Entwisle et al. 1995; DP Moore 1999; *Hong Kong*: Fan & Lui 2003:615
No signif. difference							
Females more							

11.3.6.26. Fire Fighter

All available studies have found fire fighting to be more of a male-dominated than a female-dominated occupation (Table 11.3.6.26).

Table 11.3.6.26. Fire Fighter.

Nature of Any Difference					Postpubertal	
						Adult
Males more						**NORTH AMERICA** *United States*: Cayer & Sigelman 1980; Ruccucci 1986; RL Warner et al. 1989; GB Lewis & Nice 1994; W Miller et al. 1999:222; B Kerr et al. 2002
No signif. difference						
Females more						

11.3.6.27. Fortune Teller

A study among Gypsies in several countries found that greater proportions of fortune tellers were women rather than men (Table 11.3.6.27).

Table 11.3.6.27. Fortune teller.

Nature of Any Difference							Multiple Age Categories
Males more							
No signif. difference							
Females more							**INTERNATIONAL** *Multiple Countries*: W Cohn 1973:38 (Gypsies)

11.3.6.28. Geographer/Mapping Scientist

One study of geographers concluded that a greater proportion of those in this profession were males than females (Table 11.3.6.28).

Table 11.3.6.28. Geographer/mapping scientist.

Nature of Any Difference					Postpubertal	
						Adult
Males more						**NORTH AMERICA** *United States*: Vetter & Babco 1986
No signif. difference						
Females more						

11.3.6.29. Human Services

Human service occupations usually include health care and social workers. Table 11.3.6.29 shows that more females than males are classified as human service employees.

Table 11.3.6.29. Human services.

Nature of Any Difference							Multiple Age Categories
Males more							
No signif. difference							
Females more							**NORTH AMERICA** *United States*: Brackman & Erie 1986

11.3.6.30. Janitor/Housekeeper

Numerous studies of persons who maintain the cleanliness and tidiness of buildings and homes for pay perform these tasks more than do females (Table 11.3.6.30).

Table 11.3.6.30. Janitor/housekeeper.

Nature of Any Difference						Postpubertal	
						Adult	
Males more						**MIDDLE EAST** *Israel*: Israel Central Bureau of Statistics 1997 (hotel cleaners) **NORTH AMERICA** *United States*: Rytina & Bianchi 1984:15 (janitor); Cotter et al. 1995 (housekeeper); Blau et al. 1998 (housekeeper); T Wells 1999 (housekeeper); Bianchi et al. 2000 (janitors); S Coltrane 2000 (housekeeper); PN Cohen 2004 (housekeeper) **INTERNATIONAL** *Multiple Countries*: Batalova & Cohen 2002 (housekeeper)	
No signif. difference							
Females more							

11.3.6.31. Journalist

More males than females were found to function as journalists in the one study located pertaining to this profession (Table 11.3.6.31).

Table 11.3.6.31. Journalist.

Nature of Any Difference						Postpubertal	
						Adult	
Males more						**NORTH AMERICA** *United States*: Weaver & Wilhoit 1996	
No signif. difference							
Females more							

11.3.6.32. Law Enforcement/Police Officer

Many studies have been undertaken to assess sex proportions in law enforcement. All of these studies have concluded that more males than females perform police and other law enforcement functions (Table 11.3.6.32).

Among primates, a phenomenon known as the control role (or policing) has been observed in which certain individuals in a social group take on most of the responsibility for maintaining social order by breaking up fights whenever they erupt. These individuals too are almost exclusively males. It has been proposed that evolutionary forces are responsible for control behavior in primates (Willhoite 1976; Ellis 1990; Ellis & Walsh 2000:26).

Table 11.3.6.32. Law enforcement/police officer.

Nature of Any Difference							
					Postpubertal		
						Adult	
Males more						**MIDDLE EAST** *Egypt*: Arabsheibani 1990; *Israel*: Israel Bureau of Statistics 1997 (prison guards) **NORTH AMERICA** *United States*: Tenny 1953 (police officers); Melchionne 1967 (police officers); National Advisory Commission on Criminal Justice 1973:343 (police officers); N Cayer & Sigelman 1980; Skogan & Maxfield 1981 (citizen-based neighborhood patrolling); JQ Wilson & Kelling 1982 (vigilantism); S Walker 1985; Pennell et al. 1986 (citizen-based neighborhood patrolling); Ruccucci 1986; Vetter & Babco 1986 (police and detective); RL Warner et al. 1989; GB Lewis & Nice 1994; W Miller et al. 1999:222; Harrington & Lonsway 2001 (police officers); B Kerr et al. 2002 **APE** *Gorilla*: JW Foster 1982 (control role) **PRIMATE (EXCEPT APE)** *Macaque*: Tokuda & Jensen 1968 (control role); *Multiple Primate Species*: Bramblett 1976:176 (control role); Willhoite 1976:1115 (control role)	
No signif. difference							
Females more							

11.3.6.33. Lawyer

Table 11.3.6.33 indicates that all studies of gender differences among lawyers have found a greater number of males than females in this profession.

Table 11.3.6.33. Lawyer.

Nature of Any Difference							Multiple Age Categories
					Postpubertal		
						Adult	
Males more						**MIDDLE EAST** *Egypt*: Arabsheibani 1990; *Israel*: Israel Central Bureau of Statistics 1997 (judges) **NORTH AMERICA** *United States*: US Bureau of the Census 1993	**NORTH AMERICA** *Canada*: FM Kay & Hagan 1998:737; *United States*: RH Hall 1969:334; RM Kanter 1978; Cook 1980 (judges); Abramson & Franklin 1986; Curran 1986; JS Kaye 1988; RL Able 1989; US Department of Labor-Women's Bureau 1991; CF Epstein 1993; J Hagan & Kay 1995; ABA Commission 2001
No signif. difference							
Females more							

11.3.6.34. Librarian

Research among librarians has indicated that females are more likely than males to be engaged in this occupation (Table 11.3.6.34).

Table 11.3.6.34. Librarian.

Nature of Any Difference	Postpubertal		Multiple Age Categories
		Adult	
Males more			
No signif. difference			
Females more		**MIDDLE EAST** *Egypt*: Arabsheibani 1990 **NORTH AMERICA** *United States*: Deyrup 2004	**NORTH AMERICA** *United States*: RH Hall 1969:334; Vetter & Babco 1986

11.3.6.35. Machine/Heavy Equipment Operator

Males were found to be more involved than females in operating heavy mechanized equipment (Table 11.3.6.35).

Table 11.3.6.35. Heavy equipment/machine operator.

Nature of Any Difference							
					Postpubertal		
						Adult	
Males more						**MIDDLE EAST** *Israel*: Israel Bureau of Statistics 1997	
No signif. difference							
Females more							

11.3.6.36. Management

The three available studies of managers concluded that more males than females work in management capacities (Table 11.3.6.36).

Table 11.3.6.36. Management.

Nature of Any Difference	Postpubertal
	Adult
Males more	**EUROPE** *Germany*: Dienel 1996 **NORTH AMERICA** *United States*: Deal & Stevenson 1998; Elesh 2002:323
No signif. difference	
Females more	

11.3.6.37. Manufacturing/Production Occupation

Manufacturing and production occupations involve turning raw products such as lumber and metals into some sort of marketable product such as furniture, gates, and automobiles. As shown in Table 11.3.6.37, studies of manufacturing in general indicated that most workers in these professions are males. A wide-ranging anthropological survey of persons who are most involved in manufacturing concluded that in most cultures, males are more involved than females except in the case of basket and mat weaving.

Table 11.3.6.37. Manufacturing/production occupation.

Nature of Any Difference	Postpubertal
	Adult
Males more	**NORTH AMERICA** *United States*: Rytina & Bianchi 1984:15; Kinsella & Velkoff 2001:104 **OCEANIA** *Philippines*: Lim 2000 (from 1987 through 1998) **INTERNATIONAL** *Multiple Preliterate Societies*: Murdock & Provost 1973:207* (making musical instruments, 86/88); Murdock & Provost 1973:207* (manufacture of leather, 38/74); Murdock & Provost 1973:207* (basket making, 46/130); Murdock & Provost 1973:207* (pottery making, 19/105); Murdock & Provost 1973:207* (making rope or cord, 69/111); Murdock & Provost 1973:207* (making nets, 44/65); Murdock & Provost 1973:207* (making mats, 34/103)
No signif. difference	**INTERNATIONAL** *Multiple Preliterate Societies*: Murdock & Provost 1973:207* (making musical instruments, 1/88); Murdock & Provost 1973:207* (manufacture of leather, 2/74); Murdock & Provost 1973:207* (basket making, 15/130); Murdock & Provost 1973:207* (pottery making, 6/105); Murdock & Provost 1973:207* (making rope or cord, 18/111); Murdock & Provost 1973:207* (making nets, 5/65); Murdock & Provost 1973:207* (making mats, 9/103)
Females more	**INTERNATIONAL** *Multiple Preliterate Societies*: Murdock & Provost 1973:207* (making musical instruments, 1/88); Murdock & Provost 1973:207* (manufacture of leather, 34/74); Murdock & Provost 1973:207* (basket making, 69/130); Murdock & Provost 1973:207* (pottery making, 80/105); Murdock & Provost 1973:207* (making rope or cord, 24/111); Murdock & Provost 1973:207* (making nets, 16/65); Murdock & Provost 1973:207* (making mats, 60/103)

11.3.6.38. Mathematician

According to the available evidence, males are more numerous than females in the field of mathematics (Table 11.3.6.38).

Table 11.3.6.38. Mathematician.

Nature of Any Difference	Postpubertal	Multiple Age Categories
	Adult	
Males more	**NORTH AMERICA** *United States*: AS Rossi 1965	**NORTH AMERICA** *United States*: RH Hall 1969:334
No signif. difference		
Females more		

11.3.6.39. Nursing

The available research on gender differences in the occupation of nursing has all concluded that more females than males are in this profession (Table 11.3.6.39).

Table 11.3.6.39. Nursing.

Nature of Any Difference	Postpubertal	Multiple Age Categories
	Adult	
Males more		
No signif. difference		
Females more	**AFRICA** *Jordan*: Al-Ma'aitah et al. 1996:223 **EUROPE** *Norway*: Skrede 1986 **MIDDLE EAST** *Israel*: Israel Central Bureau of Statistics 1997 **LATIN AMERICA** *Brazil*: Htun 1999:137 **NORTH AMERICA** *United States*: Fuchs 1975; Rytina & Bianchi 1984:16; Floge & Merrill 1986; Lorence 1992 (service-sector); PN Cohen 2004:247 **OCEANIA** *Australia*: Lodge et al. 1997	**NORTH AMERICA** *United States*: RH Hall 1969:334; Vetter & Babco 1986

11.3.6.40. Occupational/Vocational Therapist

The one available study of sex ratios in the field of occupational/vocational therapy concluded that more females than males are involved in this profession (Table 11.3.6.40).

Table 11.3.6.40. Occupational/vocational therapist.

Nature of Any Difference	Postpubertal
	Adult
Males more	
No signif. difference	
Females more	**MIDDLE EAST** *Israel*: Israel Central Bureau of Statistics 1997

11.3.6.41. Pharmacist

Only one study of gender differences among pharmacists was located and it indicated that males are more numerous in this occupation than females (Table 11.3.6.41).

Table 11.3.6.41. Pharmacist.

Nature of Any Difference	Postpubertal
	Adult
Males more	**EUROPE** *Britain*: Crompton & Sanderson 1990
No signif. difference	
Females more	

11.3.6.42. Physical Scientist

Physical scientists consist primarily of physicists, chemists, astronomers, and geologists. Table 11.3.6.42 indicates that most members of these professions are males.

Table 11.3.6.42. Physical scientist.

Nature of Any Difference	Postpubertal
	Adult
Males more	**MIDDLE EAST** *Egypt*: Arabsheibani 1990; *Israel*: Israel Central Bureau of Statistics 1997 (physicists) **NORTH AMERICA** *United States*: RH Hall 1969:334; MR Walsh 1977; Berryman 1983; Elesh 2002:323
No signif. difference	
Females more	

11.3.6.43. Physician

Several studies have sought to determine if gender differences exist in the proportions of individuals who become, or seek to become, physicians. As shown in Table 11.3.6.43, the answers vary according to the country being investigated. More specifically, the United States seems to be unusual in having greater proportions of male than female physicians, although recent decades have revealed a shift toward substantially greater proportions of female physicians. As the 20th Century drew to a close, almost 40% of graduating physicians in the U.S. were female (Schulman & Karney 2003:623).

Table 11.3.6.43. Physician.

Nature of Any Difference	Postpubertal
	Adult
Males more	**EUROPE** *Wales*: WE Waters 1975:50 **NORTH AMERICA** *Canada*: S Evans & Sarani 2002 (specialize in surgery); *United States*: RH Hall 1969:334; FD Blau 1979:277; Floge & Merrill 1986; Fiorentine 1987 (medical school applicants); US Department of Labor Women's Bureau 1991; Lorence 1992 (service-sector); US Bureau of the Census 1993; Lillemoe et al. 1994 (specialize in surgery); N Baxter et al. 1996 (specialize in surgery); American Medical Association 2000; HC Richardson & Redfern 2000 (specialize in surgery); C Williams & Cantillon 2000 (specialize in surgery); Mayer et al. 2001 (specialize in surgery); Schulman & Karney 2003:623 (graduating physicians)
No signif. difference	
Females more	**ASIA** *Russia*: Harden 2001; *Soviet Union*: Yanowitch 1987:351 **EUROPE** *Estonia*: Barr & Boyle 2001; *Norway*: Skrede 1986 **NORTH AMERICA** *United States*: Franks & Clancy 1993 (performing pap smears and mammograms)

11.3.6.44. Politician: Non-Elected Political Office Holder

Major examples of political office holders in non-elected positions would be cabinet ministers and governmental department secretaries. Table 11.3.6.44 suggests that males are more likely to fill these positions than are females, especially at the higher levels of political power.

Table 11.3.6.44. Politician: Non-elected political office holder.

Nature of Any Difference	Citations
Males more	**EUROPE** *Sweden*: H Holter 1973 **MIDDLE EAST** *Israel*: Rabin 1970 **NORTH AMERICA** *United States*: MK Jennings & Thomas 1968:472 (delegates to political conventions); Babchuk & Booth 1969; Orum 1974 **INTERNATIONAL** *Industrial Countries*: Duverger 1955; Almond & Verba 1963; Aldrich & Kage 2003:35 (cabinet members)
No signif. difference	
Females more	

11.3.6.45. Politician: Candidates for Elected Political Office

All available studies have indicated that candidates for political office are predominantly men, although recent decades, at least in Western countries, seem to have witnessed a substantial increase in the proportion of female candidates (Table 11.3.6.45). For example, the percentage of candidates for national offices in Ireland who were female increased from 3% in 1948 to 19% in 1997 (O'Kelly 2000:252).

Table 11.3.6.45. Politician: Candidates for elected political office.

Nature of Any Difference	Citations
Males more	**EUROPE** *Ireland*: O'Kelly 2000: 252 (increase from 3% in 1948 to 19% in 1997) **NORTH AMERICA** *United States*: Karnig & Walter 1976 (candidates); Darcy & Scramm 1977 (candidates); S Welch et al. 1991 (candidates); C Chaney & Sinclair 1994 (national); Paolino 1995 (candidates); Matland & Studlar 1996
No signif. difference	
Females more	

11.3.6.46. Politician: Holding Elected Political Office

A large number of studies have been conducted throughout the world in which the proportions of men and women holding political office have been compared. As shown in Table 11.3.6.46, all of these studies have concluded that male proportions surpass those of female, typically by at least 3 or 4 to 1.

Table 11.3.6.46. Politician: Holding elected political office.

Nature of Any Difference	Citations
Males more	**AFRICA** *Angola*: McCullough 1952; *South Africa*: Schapera 1930 (Khoisan tribe) **ASIA** *China*: Andors 1983; Whyte 1984; Bauer et al. 1992; Gilmartin 1993; *Japan*: O'Reilly 1983:69; *Russia*: Nechemias 1994; W Slater 1994; *Soviet Union*: W Mandel 1975; BG Rosenthal 1975 **EUROPE** *Britain*: S Welch & Studlar 1990*; *Finland*: Paasilinna 1987; *Ireland*: M Manning 1978; RL Engstrom 1987; Galligan 1992; Galligan & Wilford 1999; *Norway*: Matland 1994:273 **MIDDLE EAST** *India*: Rajalakshmi 1985; Swarup et al. 1994; Hoskyns & Rai 1998:347; *Iran*: Azari 1983; Fathi 1985; *Islamic Countries*: Kazemi 2000; *Israel*: Rabin 1970:298 **NORTH AMERICA** *United States*: Duverger 1955:145; Werner 1966; MK Jennings & Thomas 1968:472; Lamson 1968:23; Werner 1968:43; R Darcy & Scramm 1977; I Diamond 1977; Gehlen 1977; Merritt 1977; Hedlund et al. 1979; M Johnson 1980; DW Stewart 1980:4; I Diamond & Hartsock 1981; DB Hill 1981; Rule 1981; Schramm 1981; SJ Carroll & Strimling 1983; Antonlini 1984; Center for American Women and Politics 1984; Gertzog 1984; G Schubert 1985; S Welch et al. 1985; R Darcy et al. 1987; Gona 1987; National Women's Political Caucus 1987; Rule 1987; Burt-Way 1988; R Kelly et al. 1988; Saint-Germain 1989; US Bureau of the Census 1989:253; E Costantini 1990; S Welch & Studlar 1990*; Berkman & O'Connor 1993 (state legislature); Burrell 1994; SJ Carroll 1994; R Darcy et al. 1994; S Thomas 1994; Gertzog 1995; Matland & Studlar 1996; RL Fox 1997 (congress); R Seltzer et al. 1997; Center for American Women in Politics 2000; Center for American Women in Politics 2001; Dolan 2001; Bratton 2002 (state legislatures); Center for American Women in Politics 2003 (senate, house of representatives & governor); L Elder 2004:28 **INTERNATIONAL** *Multiple Countries*: NJ Adler 1996; *Industrial Countries*: Aldrich & Kage 2003:35; *Pre-Industrial Societies*: Whyte 1978:217* (multiple preliterate societies, 72 of 74); Whyte 1978; *Several Latin American Countries*: Aviel 1981
No signif. difference	**INTERNATIONAL** *Industrial Societies*: Whyte 1978:217* (multiple preliterate societies, 2 of 74)
Females more	

11.3.6.47. Sales Occupations

Most of the research has concluded that females are more likely than males to be involved in sales occupations (Table 11.3.6.47).

Table 11.3.6.47. Sales occupations.

Nature of Any Difference	Postpubertal	
		Adult
Males more		
No signif. difference		**NORTH AMERICA** *United States*: Kinsella & Velkoff 2001:104
Females more		**EUROPE** *Sweden*: Sundin 2001:101 (95%, cashier) **NORTH AMERICA** *United States*: Rytina & Bianchi 1984:16 **OCEANIA** *Philippines*: Floro & Schaefer 1998:88

11.3.6.48. Scientist and Engineer (Outside of Academia)

Research has repeatedly shown that the fields of science and engineering (aside from teaching in these disciplines) are dominated by males (Table 11.3.6.48).

Table 11.3.6.48. Science and engineering (outside of academia).

Nature of Any Difference	Postpubertal		Multiple Age Categories
		Adult	
Males more		**MIDDLE EAST** *Israel*: Israel Central Bureau of Statistics 1997 (physicists) **EUROPE** *Britain*: Devine 1992; Evetts 1994; Smeaton et al. 1997 **NORTH AMERICA** *United States*: AS Rossi 1965; Rossiter 1982; Vetter & Babco 1986 (aerospace); JR Cole 1987; Jagacinski 1987 (engineer); Rodin & Ickovics 1990 (medical research); Chesney 1993 (medical research); US Bureau of the Census 1993; Wenger et al. 1993 (medical research); KG Low et al. 1994 (medical research); Vetter 1994 (engineer); R Bruner 1998; HS Farmer et al. 1998; National Science Foundation 2000	**NORTH AMERICA** *United States*: RH Hall 1969:334; SA Menninger & Rose 1980; Wickware 1997; Mervis 1999
No signif. difference			
Females more			

11.3.6.49. Secretaries

The two studies concerning sex differences in secretarial work both concluded that more females than males are secretaries (Table 11.3.6.49).

Table 11.3.6.49. Secretaries.

Nature of Any Difference	Postpubertal
	Adult
Males more	
No signif. difference	
Females more	**MIDDLE EAST** *Israel*: Israel Central Bureau of Statistics 1997 **NORTH AMERICA** *United States*: PN Cohen 2004:247

11.3.6.50. Shaman/Witch Doctor

A broad-ranging anthropological study of 73 different cultures concluded that most or all shaman in 40 cultures were males and that most or all shamans in only 7 cultures were females (Table 11.3.6.50).

Table 11.3.6.50. Shaman/witch doctor.

Nature of Any Difference	Postpubertal
	Adult
Males more	**INTERNATIONAL** *Multiple Preliterate Societies*: Whyte 1978:216* (40 out of 73)
No signif. difference	**INTERNATIONAL** *Multiple Preliterate Societies*: Whyte 1978:216* (26 out of 73)
Females more	**INTERNATIONAL** *Multiple Preliterate Societies*: Whyte 1978:216* (7 out of 73)

11.3.6.51. Ship Captains

The majority of ship captains are males according to the one available study of this occupation (Table 11.3.6.51).

Table 11.3.6.51. Ship captains.

Nature of Any Difference	Postpubertal
	Adult
Males more	**MIDDLE EAST** *Israel*: Israel Central Bureau of Statistics 1997
No signif. difference	
Females more	

11.3.6.52. Sports Commentators

The one study of sports commentators found them to be overwhelmingly men (Table 11.3.6.52).

Table 11.3.6.52. Sports commentators.

Nature of Any Difference	Postpubertal
	Adult
Males more	**NORTH AMERICA** *United States*: Coventry 2004:331
No signif. difference	
Females more	

11.3.6.53. Social/Welfare Worker

All studies of social workers have concluded that they are more often females rather than males (Table 11.3.6.53).

Table 11.3.6.53. Social/welfare worker.

Nature of Any Difference	Postpubertal	Multiple Age Categories
	Adult	
Males more		
No signif. difference		
Females more	**EUROPE** *Norway*: Skrede 1986 **MIDDLE EAST** *Israel*: Israel Central Bureau of Statistics 1997 **NORTH AMERICA** *United States*: Kessler-Harris 1981; GB Lewis & Nice 1994 (government workers); W Miller et al. 1999:222 (government workers); B Kerr et al. 2002 (government workers)	**NORTH AMERICA** *United States*: RH Hall 1969:334; Vetter & Babco 1986 (welfare)

11.3.6.54. Teacher: College Professor

Research in multiple countries has revealed that more college teachers are males than females (Table 11.3.6.54).

Table 11.3.6.54. Teacher: college professors.

Nature of Any Difference	Postpubertal
	Adults
Males more	**EUROPE** *Britain*: Halvorsen 2002; *Greece*: Hopf & Hatzichristou 1999:4; *Spain*: J Fernandez & Mateo 1997:999 **MIDDLE EAST** *Turkey*: Dogramaci 1993; Neusel 1994; Kandiyoti 1997; Ozguc 1998 **NORTH AMERICA** *Canada*: PJ Caplan 1993; *United States*: RH Hall 1969:334; PA Graham 1978; Vetter & Babco 1986:75; Simeone 1987; Aisenberg & Harrington 1988; US Department of Labor-Women's Bureau 1991; A Gibbons 1992 (science & engineering); LH Collins et al. 1998; Lawler 2002 (professor) **INTERNATIONAL** *Multiple Countries*: JA Jacobs 1996:158 (in 67/67 countries); Ozbilgin & Healy 2004:359
No signif. difference	
Females more	

11.3.6.55. Teacher: Primary and Secondary Teacher

Many studies have documented the gender of primary and secondary teachers, and have generally concluded that females are involved in this profession more than males, although a couple of studies have failed to find a significant gender difference at either the primary or secondary school level (Table 11.3.6.55).

Table 11.3.6.55. Teacher: primary and secondary teacher.

Nature of Any Difference	Postpubertal
	Adult
Males more	**NORTH AMERICA** *United States*: Branan 1971 (primary, principals)
No signif. difference	**EUROPE** *Greece*: Hopf & Hatzichristou 1999:5* (primary) **NORTH AMERICA** *United States*: Rytina & Bianchi 1984:16* (secondary)
Females more	**ASIA** *Soviet Union*: Yanowitch 1987:351 (primary & secondary) **EUROPE** *Greece*: Hopf & Hatzichristou 1999:5* (secondary); *Norway*: Skrede 1986 (primary & secondary) **LATIN AMERICA** *Brazil*: Htun 1999:137 (primary) **MIDDLE EAST** *Israel*: Sprintzak et al. 1995 (primary & secondary) **NORTH AMERICA** *United States*: Branan 1971 (primary); PC Lee 1973:80 (primary); National Education Association 1973 (elementary); Fuchs 1975 (primary); Kessler-Harris 1981:65 (primary); Rytina & Bianchi 1984:16* (primary); Vetter & Babco 1986 (kindergarten, primary & secondary); National Center for Educational Statistics 1994 (primary & secondary); PN Cohen 2004 (elementary & secondary)

11.3.6.56. Tending Livestock

Two studies of predominantly school age children who spent considerable time tending cattle and other livestock as they grazed concluded that more boys than girls were involved in this activity (Table 11.3.6.56).

Table 11.3.6.56. Tending livestock.

Nature of Any Difference	Preadolescent
	Childhood
Males more	**AFRICA** *Kenya*: Kayongo-Male & Walji 1984:91; *Zambezi*: P Reynolds 1991:120
No signif. difference	
Females more	

11.3.6.57. Textile Sewing Machine Operator

The one study located that examined gender differences in those who operate textile sewing machines concluded that females do so more than males (Table 11.3.6.57).

Table 11.3.6.57. Textile sewing machine operator.

Nature of Any Difference			Multiple Age Categories
Males more			
No signif. difference			
Females more			**NORTH AMERICA** *United States*: Vetter & Babco 1986

11.3.6.58. Truck Driving (Long-Distance Hauling)

According to the two pertinent studies, truck drivers are more likely to be males than females (Table 11.3.6.58).

Table 11.3.6.58. Truck driving (long-distance hauling).

Nature of Any Difference	Postpubertal	
		Adult
Males more		**NORTH AMERICA** *United States*: Rytina & Bianchi 1984:15; Vetter & Babco 1986
No signif. difference		
Females more		

11.3.7. Wealth, Income, and Promotions

Research findings concerning gender differences in wealth, wages, and job promotions are summarized below.

11.3.7.1a. Earnings/Salary for Workers (Except for North America) Regardless of Occupation

As shown in Split-Table 11.3.7.1a, nearly all studies have found that the average salaries of males exceeded those of females. The only significant qualification involves noting that men's and women's salaries are usually quite similar when they first enter the workforce (usually in their 20s) (O'Neill & Polachek 1993:210). From then on, however, men's salaries increasingly outpace women's (RA Rosenfeld 1980; Blau & Kahn 2000:78). Overall, one can say that no society has yet been found in which the average salary for full-time women employees exceeds that for full-time men workers. With the exception of entry-level jobs and retirement income, males are paid significantly more than females in all societies.

Split-Table 11.3.7.1a. Earnings/salaries for workers except North America regardless of occupation.

Nature of Any Difference	Citations to Studies
Higher for males	**AFRICA** *Kenya*: Agesa & Agesa 2005; *South Africa*: Hinks et al. 2002; *Zambia*: Floro & Schaefer 1998:81* (in all sectors except clerical work) **ASIA** *China*: Lim 1990:111 (manufacturing); Meng & Miller 1995; Matthews & Nee 2000 (non-farm workers); Kidd & Meng 2001; *Hong Kong*: Fan & Lui 2003; *Japan*: Brinton 1989; Aiba & Wharton 2001; *Philippines*: Lim 2000:1298 (per hour); *Russia*: Linz 1996; Ogloblin 1999; Reilly 1999; *Soviet Union*: JS Schwartz 1979; V Koval 1991; Funk 1993; Brainerd 2000; K Katz 2001; *Vietnam*: Liu 2004 (during the 1990s); *Several Asian Countries*: Deyo 1989; Seguino 2002 **EUROPE** *Britain*: PW Miller 1987; Pugh & Moser 1990; B Davies & Ward 1992; RG Wood et al. 1993 (lawyers); Ginn & Arber 1994; Schneer & Reitman 1994 (among MBAs); Broadbridge 1995 (full time workers); F.M. Kay & Hagan 1995 (lawyers); Paci et al. 1995; Ginn & Arber 1996; J Church 1997; Joshi & Paci 1998 (full time workers); Rubery et al. 1998; Ginn & Arber 2000; M Hampton et al. 2000 (college faculty); JG Oakley 2000 (managers); T Warren et al. 2001:481; T Warren 2003; *Bulgaria*: Brainerd 2000* (post-communist); Jolliffe 2002 (post-communist); *Central Europe*: Pailhe 2000; *Czech Republic*: Jurajda 2001; *Estonia*: Orazem & Vodopivec 2000; *Finland*: Stolte-Heiskanen 1991; *Germany*: Nickel 1992; J Smith & Baltes 1998; Newell & Reilly 2001 (East Germany, full time workers); J Hunt 2002; Bornman & Enders 2004:37 (among PhD holders); *Netherlands*: De Riiyter & Huffman 2003; *Poland*: Adamchik & Bedi 2000 (full time workers); Adamchik & Bedi 2003 (full time workers); Grajek 2003; *Romania*: Paternostro & Sahn 1999 (post-communist); *Spain*: Beneria 1977; Peinado Lopez 1988; Liceras & Murillo de la Vega 1992; Saez Lara 1994; Garcia de Cortazar & Garcia de Leon 1997 (university professors); Instituto de la Mujer 1997; Castano et al. 1999; Martin Urriza & Zarapuz Puertas 2000; *Sweden*: Dahlstrom 1967:296; Palme & Wright 1992; Lofstrom 1989 (full time workers); le Grand 1994; Petersen & Morgan 1995; Arai & Thoursie 1997 (full-time workers);Edin & Richardson 1997 (full time workers); Granqvist 1997 (full time workers); Hutlin & Szulkin 1999; Nekby 2003; *Yugoslavia*: Prpic 1989; *Multiple Eastern European Countries*: Brainerd 2000 (full time workers); Pailhe 2000 (full time workers) **LATIN AMERICA** *Brazil*: Htun 1999:137; Barreto et al. 2004:112* (over 60; personal income); *Jamaica*: Hotchkiss & Moore 1996; *Mexico*: C Brown et al. 1999; *Multiple Latin American Countries*: Psacharopoulos & Tzannatos 1992 **MIDDLE EAST** *Egypt*: Arabsheibani 1990; *Israel*: Izraeli & Silman 1992; Semyonov & Lewin-Epstein 1994:57; Hellerstein & Neumark 1999 **OCEANIA** *Australia*: FL Jones 1983; F Jones 1984; Chapman & Mulvey 1986; Gunderson 1989; Hawke 1991; PW Miller & Rummery 1991; Gregory & Daly 1991; M Western 1991; Australian Bureau of Statistics 1993:179; M Kidd 1993; PW Miller 1994; Langford 1995; M Kidd & Shannon 1996; Kidd & Mengh 1997; Wooden 1997; Borland 1999a; Borland 1999b; Preston & Crockett 1999; Charles 2000 (full-time workers); M Kidd & Shannon 2001; MP Kidd & Shannon 2002; Meng 2004:560; *New Zealand*: S Hammond & Harbridge 1995 **INTERNATIONAL** *Multiple Industrial Countries*: Oaxaca 1973; Treiman & Roos 1983:613; Blau & Ferber 1985; Boserup 1986; G Goldberg & Kremen 1987; FD Blau & Kahn 1992; LH Clark 1993 (in management); Dijkstra & Hanmer 2000:49; *Multiple Countries*: RG Gregory et al. 1989; Rosenfeld & Kalleberg 1990:84; RA Rosenfeld & Kalleberg 1990; FD Blau & Kahn 1992; O'Neill & Polachek 1993; Reskin & Padavic 1994; FD Blau & Kahn 1996; Antecol 2000; Antecol 2001; Reilly 2002; Antecol 2003
No signif. difference	**AFRICA** *Zambia*: Floro & Schaefer 1998:81* (clerical work) **ASIA** *Former Soviet Union*: Ogloblin 2002:189 (retirement income)
Higher for females	**ASIA** *Former Soviet Union*: Yanowitch 1987:353 **EUROPE** *Britain*: Office for National Statistics 1996 (Black Caribbean); Modood et al. 1997 (Black Caribbean) **LATIN AMERICA** *Brazil*: Barreto et al. 2004:112* (over 60; household income)

11.3.7.1b. Earnings/Salary (for North American Workers) Regardless of Occupation

An enormous number of studies have been undertaken to determine which sex earns more per hour or per year (among full-time workers) in the United States and Canada. Several of these studies pertained to the paid workforce in general, while others had to do with specific occupational areas. As shown in Split-Table 11.3.7.b, all but a few of these studies concluded that men earn more than women. The lone exceptions either involved experimental studies or studies of mentally retarded persons, among whom no significant sex gender differences were found.

Split-Table 11.3.7.1b. Earnings/salaries for North American workers regardless of occupation.

Nature of Any Difference	Citations to Studies
Higher for males	**NORTH AMERICA** *Canada*: Gunderson 1979 (full-time workers); Ornstein 1983:53; P Miller 1987 (full-time workers); D Shapiro & Stelcner 1987 (full-time workers); M Boyd et al. 1991; Doiron & Riddell 1994 (full-time workers); M Kidd & Shannon 1994; M Baker et al. 1995 (full-time workers); Wannell & Caron 1995 (college graduate); M Kidd & Shannon 1996; Beaudry & Green 1997 (full-time workers); M Kidd & Shannon 1997 (full-time workers); Gunderson 1998 (full-time workers); KT Reilly & Wirjanto 1999; Christie & Shannon 2001 (full-time workers); Desmarais & Curtis 2001:160; M Shannon & Kidd 2001 (full-time workers); *United States*: TW Schultz 1961; Mincer 1962; H Sanborn 1964; Malkiel 1970; MS Cohen 1971; Fuchs 1971 (hourly wages); DA Peterson 1972; JR Cole & Cole 1973; Malkiel & Malkiel 1973 (professional workers); Oaxaca 1973; Sawhill 1973 (full-time workers); B Bergmann 1974; Mincer & Polachek 1974; Cutler & Harootyan 1975 (persons who are single); Polachek 1975 (full-time workers); Treiman & Terrell 1975 (years of education controlled); Featherman & Hauser 1976; Blau 1977; Mincer & Polachek 1978 (full-time workers); Sandell & Shapiero 1978 (full-time workers); Blau & Hendricks 1979; Corcoran 1979 (full-time workers); Corcoran & Duncan 1979; P England & McLaughlin 1979; Halaby 1979; Lloyd & Niemi 1979 (full-time workers); Vanfossen 1979:126; WC Wolf & Fligstein 1979a; R Brown et al. 1980a; Liang et al. 1980; RA Rosenfeld 1980; BM Vetter 1980; Roos 1981; Treiman & Hartmann 1981; Weiss & Gronau 1981; Beller 1982; F Crosby 1982; Mincer & Ofek 1982 (full-time workers); EO Wright et al. 1982; Coverman 1983; SJ Lundberg & Startz 1983; Bielby & Baron 1984; Daymont & Andrisani 1984 (college graduates); Major & Konar 1984; GS Becker 1985; FD Blau & Ferber 1985; Filer 1985; Madden 1985; O'Neill 1985; Spaeth 1985; KB Ward & Mueller 1985; Bane 1986; Fuchs 1986; Hartman et al. 1986; Hodson & England 1986 (full-time workers);Women's Bureau 1986; JR Cole 1987; Mellor 1987; Pfeffer & Davis-Blake 1987; Sorenson 1987; Tienda et al. 1987; US Bureau of the Census 1987; FD Blau & Beller 1988; Coverdill 1988; DiPrete & Soule 1988; England et al. 1988; SM Freedman & Phillips 1988 (full-time workers); US Bureau of Labor Statistics 1988; Acker 1989; JN Baron & Newman 1989; Gunderson 1989; Jacobs 1989; Jaffee 1989; Marini 1989; McLanahan et al. 1989; E Sorensen 1989; Even & Macpherson 1990; Gerhart 1990 (occupational level controlled, college graduates' staring salary); Goldin 1990; JA Jacobs & Steinberg 1990; Kalleberg & Rosenfeld 1990; Koretz 1990; Lazear & Rosen 1990; Paglin & Rufolo 1990 (college graduates); Pfeffer & Ross 1990; Reskin & Roos 1990; Weiler 1990 (researchers/professors); K Wilson & Boldizar 1990; Crispell 1991; Fuller & Schoenberger 1991 (college grads starting salary); Gerhart & Rynes 1991 (MBAs); Gregory & Daly 1991; Groshen 1991a; Groshen 1991b; Loscocco et al. 1991 (self-employed); J Pfeffer & Konrad 1991; VE Richardson & Kilty 1991 (elderly, after retirment); FD Blau & Kahn 1992; MJ Davidson & Cooper 1992; England & Browne 1992:32; LA Jackson 1992 (full-time employees); JA Jacobs 1992:296; Loprest 1992; Rummery 1992; Stroh et al. 1992; Bullard & Wright 1993; Burkhauser & Salisbury 1993; Greenglass 1993 (managers); WN Grubb 1993:370; VM Keith 1993; PY Martin & Harkreader 1993; G McGuire & Reskin 1993; J O'Neill & Polachek 1993; CK Stevens et al. 1993 (college); Spalter-Roth et al. 1993:18 (self-employed); Tomaskovic-Devey 1993; R.G. Wood et al. 1993 (lawyers); FD Blau & Kahn 1994; Bellas 1994 (researchers/professors); Blanchflower & Oswald 1994; Chauvin & Ash 1994 (full-time); Cornwell & Kellough 1994; England et al. 1994; Even & Macpherson 1994 (elderly, retirement income, pension); Kilbourne et al. 1994; WC King & Hinson 1994 (college, experimental conditions); Major 1994; Mendes de Leon et al. 1994; Reskin & Padavic 1994:101; CE Ross & Bird 1994; Reitzes & Mutran 1994; Tharenou et al. 1994; Bernhardt et al. 1995; Folbre 1995; Joshi et al. 1995; TA Judge et al. 1995; D Macpherson & Hirsch 1995; Millward & Woodland 1995; T Petersen & Morgan 1995; Schneer & Reitman 1995; Solberg & Laughlin 1995; Ashraf 1996; Blackorby & Wagner 1996 (persons with mental retardation); FD Blau & Kahn 1996; Borjas 1996:350; Furchgott-Ruth & Stolba 1996; Gerhart et al. 1996; S Harding & McGregor 1996; Ranson & Reeves 1996 (high tech occupations); JA Jacobs 1996:175; Lichtenstein 1996; MH Meyer & Pavalko 1996; Olsen & Sexton 1996; US Bureau of the Census 1996 (full-time employees); FD Blau & Kahn 1997; C Brown & Corcoran 1997 (college graduates); SM Crampton et al. 1997; Huang 1997; Huffman & Velasco 1997; Budig 2002; Loury 1997 (college graduates); Marini & Fan 1997; Mutran et al. 1997:S93 (ages 58-64); FD Blau et al. 1998; Carrington & Troske 1998 (manufacturing); Gasser et al. 1998; Hoff 1998; D Robinson 1998; Toutkoushian 1998 (researchers/professors); Tsui 1998:370 (college graduates); US Department of Labor 1998; Weinberger 1998 (college graduates); Arber & Cooper 1999; AP Barkley et al. 1999 (college graduates); JM Firestone et al. 1999; Hutlin & Szulkin 1999; R Johnson et al. 1999 (elderly, retirement income pension); RL Nelson & Bridges 1999; Raphael & Riker 1999:42; SE Turner & Bowen 1999; Antecol 2000; FD Blau & Kahn 2000; Gill & Leigh 2000; R Hogan et al. 2000 (in the 1970s); Hojat et al. 2000; Keaveny & Inderrieden 2000; M Reid et al. 2000; US Department of Labor 2000; Bellas et al. 2001; Danigelis & McIntosh 2001; Sicilian & Grossberg 2001 (under age 36); US Department of Labor 2001; Heckert et al. 2002 (college students); Kirchmeyer 2002 (MBA graduates, except immediately after graduation); P Levine et al. 2002 (elderly, retirement income); KJ Meier & Wilkins 2002; Joy 2003 (college graduates); Montgomery & Powell 2003; Even & Macpherson 2004 (elderly, retirement income); CB Golberg et al. 2004; Huffman 2004; Keene & Quadagno 2004; R Hogan et al. 2005 (in the 1990s) **INTERNATIONAL** *Multiple Countries*: Kalleberg & Rosenfeld 1990; Blau & Kahn 1995; Blau & Kahn 1996
No signif. difference	**NORTH AMERICA** *United States*: MJ Kimmel et al. 1980 (experimental); DJ Pruitt et al. 1986 (experimental); LA Morgan 1998 (young adults); D Olson et al. 2000:93 (persons with mental retardation)
Higher for females	

11.3.7.1c. Income/Salaries for Specific Occupational Areas

Findings concerning sex differences in earnings confined to specific (largely professional) occupations are presented in Split-Table 11.3.7.1c. These studies effectively control for any gender differences in education levels. With few exceptions, males earn more than do females in all specific occupations.

Split-Table 11.3.7.1c. Earnings/salaries for specific occupational areas.

Nature of Any Difference			Citations to Studies
Higher for males			**NORTH AMERICA** *Canada*: BD Adam & Baer 1984:39 (lawyers); J Hagan 1990 (lawyers); Greenglass 1993 (managers); Chaykowski 1994 (manufacturing workers); Kay & Hagan 1995:288 (lawyers); Soroka 1999 (service & manufacturing workers); J Tanner et al. 1999 (pharmaceutical industry); *United States*: AE Bayer & Astin 1968 (college professors); Glancy 1970 (lawyers); Fuchs 1971 (hourly wage); GE Johnson & Stafford 1974 (college professors); Bibb & Form 1977 (blue collar workers); MA Ferber & Kordick 1978 (college professors); Klebanoff 1980:72 (physicians); MF Fox 1981 (college professors); Rosner 1984 (dentists);MJ Clark & Centra 1985 (college professors); Bowen & Schuster 1986 (college teachers); Tolbert 1986 (college teachers); Barbezat 1987 (college professors); Jagacinski 1987 (engineers); Avery & Martin 1988 (dentists); Barbezat 1987 (researchers/professors); J Hagan 1990 (lawyers); Uhlenberg & Cooney 1990 (dentists); Gerhart & Rynes 1991 (among MBA grads); Holden 1991:1112 (research scientists); McElrath 1992:274 (college professors); Reskin & Ross 1992:359 (managers); Wadman 1992 (dentists); AJ Wellington 1993 (lawyers); RG Wood et al. 1993 (lawyers); Bellas 1994 (college teachers); Langton & Pfeffer 1994 (college professors); Dedabbeleer et al. 1995 (among physicians, AMA 2000); Kaldenberg et al. 1995 (dentists); Reskin & Ross 1995 (managers); LC Baker 1996 (among physicians); CE Bird 1996* (dentists); CE Bird 1996* (veterinarians); Dresler et al. 1996 (among physicians); Catalyst 1998 (corporate executives); DE Hecker 1998 (starting salaries for graduate students); Lublin 1998 (top executives); Lasky 1999 (psychotherapists); McMurray et al. 2000 (among physicians); Nettles et al. 2000 (researchers/professors); Yupin et al. 2000 (starting salary for business majors); BM Barber & Odean 2001:276 (stock investors); ML Bellas et al. 2001 (university faculty); Renner et al. 2002 (corporate executives); AE Wallace & Weeks 2002 (physicians); TJ Hoff 2004:306 (among physicians); Roth 2004 (stock investors)
No signif. difference			**NORTH AMERICA** *United States*: Gomez-Mejia & Balkin 1992 (university professors in business management, after controlling for rank, publications, & teaching evaluations); Broder 1993 (university professors in economics, new hires after controlling for rank, publications, & teaching evaluations)
Higher for females			

11.3.7.2. Trends in Income Inequality Between the Sexes

Gender differences in earnings are nothing new. In the Old Testament, one finds a decree in Leviticus (27:1-4) that women should be paid 30 shekels of silver for their work while men should receive 50 shekels. This 60% ratio is close to the sex difference that is typical today in most countries at least until the 1970s. Since then, the gap has narrowed considerably in most industrialized nations, although, as noted in the preceding table, never to the point of equality.

Table 11.3.7.2 presents findings from a number of studies that have traced decade-by-decade trends in the degree of inequality between the sexes in terms of average earnings for full-time work primarily in the United States and Canada. These studies reveal that compared to the 1940s, gender differences in average earnings increased in the 1950s, with essentially no change during the 1960s. Thereafter, the disparities have gradually decreased with each passing decade. By the 1990s, women in the United States were earning about 72 cents for every dollar being earned by men (O’Neill & Polachek 1993:206; Blau & Kahn 2000:76).

Table 11.3.7.2. Trends in income inequality between the sexes.

Nature of the Trend	Decades				
	1950s	1960s	1970s	1980s	1990s
Increase in the difference	**NORTH AMERICA** *United States*: Blau & Hendricks 1979*; O'Neill & Polachak 1993:206*				**ASIA** *Taiwan*: Berik 2000:10
No signif. change		**NORTH AMERICA** *United States*: Jaynes & Williams 1989:295; O'Neill & Polachak 1993:206*; Blau & Kahn 2000:76*	**NORTH AMERICA** *United States*: Bianchi & Spain 1986:24*; Jacobs 1989; Blau & Kahn 2000:76*		
Decrease in the difference		**NORTH AMERICA** *United States*: Blau & Hendricks 1979*	**NORTH AMERICA** *Canada*: Soroka 1987; Grenier & Joseph 1993; M Baker et al. 1995; Statistics Canada 1998*; Soroka 1999:572*; *United States*: O'Neill & Polachak 1993:206*; Wellington 1993*; Ashraf 1996* **OCEANIA** *Australia*: Borland 1999a* **INTERNATIONAL** *Several Industrialized Countries*: N Forsythe et al. 2000*	**NORTH AMERICA** *Canada*: Grenier & Joseph 1993; M Baker et al. 1995; Statistics Canada 1998*; Soroka 1999:572*; *United States*: Bianchi & Spain 1986:24*; O'Neill & Polachak 1993:206*; Wellington 1993*; Blau & Kahn 1994; Wellington 1994; Ashraf 1996*;Borjas 1996:350; Blau & Kahn 1997; Blau 1998; Blau & Kahn 2000:76*; Gill & Leigh 2000 **OCEANIA** *Australia*: Borland 1999a*; M Kidd & Shannon 2001* **INTERNATIONAL** *Several Industrialized Countries*: N Forsythe et al. 2000*	**NORTH AMERICA** *Canada*: Statistics Canada 1998*; Soroka 1999:572*; *United States*: Bianchi & Spain 1986:24*; Blau & Kahn 2000:76* **OCEANIA** *Australia*: M Kidd & Shannon 2001*

11.3.7.3. Variability of Income

The few studies that have examined the degree of variation in the incomes of men and women (among full-time workers) have largely concluded that the incomes of men exhibit greater variability than do the incomes of women (Table 11.3.7.3).

Table 11.3.7.3. Variability of income.

Nature of Any Difference	Postpubertal	Multiple Age Categories
	Adult	
Males more	**EUROPE** *Britain*: Koskinen & Martelin 1994 **NORTH AMERICA** *United States*: Loury 1997*	**NORTH AMERICA** *United States*: GS Becker 1975:178
No signif. difference	**NORTH AMERICA** *United States*: Loury 1997* (young)	
Females more		

11.3.7.4. Income Positively Affected by Being Married

According to one study, men's incomes tended to rise more than women's simply by being married. In fact, this study suggested that women's incomes were actually suppressed by marriage (Table 11.3.7.4).

Table 11.3.7.4. Income positively affected by being married.

Nature of Any Difference	Postpubertal
	Adult
Male's income more	**NORTH AMERICA** *United States*: Antecol 2003 (immigrants)
No signif. difference	
Female's income more	

11.3.7.5. Income Negatively Affected by Having Children

One study indicated that the incomes of women are more adversely affected by having children than are the incomes of the men to whom they were married (Table 11.3.7.5).

Table 11.3.7.5. Income negatively affected by having children.

Nature of Any Difference	Postpubertal	
		Adult
More for males		
No signif. difference		
More for females		**NORTH AMERICA** *United States*: Antecol 2003 (immigrants)

11.3.7.6. Promotion Rate/Upward Mobility in General

Many studies have sought to determine if sex differences exist in the rate at which male and female employees are promoted. Some of these studies have confined the investigation to very narrow occupational categories (particularly college teaching and civil service), while others have been much broader in coverage. Table 11.3.7.6 shows that with only one minor exception, research has determined that males are promoted at higher rates than females.

Table 11.3.7.6. Promotion rate/upward mobility in general.

Nature of Any Difference	Citations
Higher rates for males	**AFRICA** *Zambia*: T Turner & O'Connor 1994 (civil services) **ASIA** *Japan*: Brinton 1993; S Buckley 1993; Kawashima 1995; B Molony 1995; Creighton 1996; Ogasawara 1998 **EUROPE** *Britain*: Goldthorpe et al. 1987; G Marshall et al. 1988; Abbott & Payne 1990; Alimo-Metcalfe 1995; *France*: RV Robinson & Garnier 1985; Portocarero 1983a*; Portocarero 1983b*; Portocarero 1985*; Portocarero 1987*; *Germany*: Li & Singelmann 1998*; Bornmann & Enders 2004:34 (PhD); *Sweden*: Portocarero 1983a*; Portocarero 1983b*; Portocarero 1985*; Portocarero 1987*; Portocarero 1989 **LATIN AMERICA** *Trinidad & Tobago*: Bissessar 1999 (civil services) **NORTH AMERICA** *United States*: J Bernard 1964:120 (college teaching); AE Bayer & Astin 1968 (college teaching); JR Cole & Cole 1973 (college teaching); ND Glenn et al. 1974; Tyree & Treas 1974; AE Bayer & Astin 1975:801 (college teaching); RM Hauser et al. 1977; JR Cole 1979; National Research Council 1979:60 (college teaching); Reskin & Hargens 1979:117; Ahem & Scott 1981; JR Cole 1981 (college teaching); Y Weiss & Lillard 1982 (college teaching); Cole & Zuckerman 1984 (university professor); Szafran 1984 (college teaching); RA Rosenfeld & Jones 1986 (college teaching); PD Allison & Long 1987 (college teaching); AM Morrison et al. 1987; DiPrete & Soule 1988 (civil service); Hachen 1988:35; PD Allison & Long 1990 (college teaching); Spurr 1990 (lawyers); Ehrenberg 1991 (college teaching); Hurlbert & Rosenfeld 1992 (college teaching); Stroh et al. 1992; Fagenson 1993; Kahn 1993 (economy professors); JS Long et al. 1993 (biochemistry college teaching); S Morgan et al. 1993; Kahn 1995 (economy professors); Tesch et al. 1995 (academic medicine); Higginbotham & Romero 1997; Li & Singelmann 1998*; Cobb-Clark & Dunlop 1999* (in 1990); C Edwards et al. 1999; McDowell et al. 1999a (economy professors); McDowell et al. 1999b (economy professors); Powell 1999 (management positions); Ginther & Hayes 2003 (economy professors); Goldberg et al. 2004 (managers) **INTERNATIONAL** *Several Industrial Countries*: PA Ross 1985; Li & Singelmann 1998*; R Erikson & Goldthorpe 1992
No signif. difference	**NORTH AMERICA** *United States*: Cobb-Clark & Dunlop 1999* (in 1996)
Higher rates for females	

11.3.7.7. Inheritance of Wealth and Property

One study of inheritance patterns concluded that men tended to receive higher inheritance awards than women (Table 11.3.7.7).

Table 11.3.7.7. Inheritance of wealth and property.

Nature of Any Difference						Multiple Age Categories
Males more						**OCEANIA** *Philippines*: Estudillo et al. 2001a (rural, land inheritance)
No signif. difference						
Females more						

11.3.7.8. Profit Making from Small Businesses

Studies undertaken to determine if a sex difference exists in the ability to make a profit in small business ventures have either concluded that males make more than do females or that there is no gender difference when controls are introduced for such things as the type of business and the years the business has been operating (Table 11.3.7.8).

Table 11.3.7.8. Profit making from small businesses.

Nature of Any Difference						Multiple Age Categories
Males more						**NORTH AMERICA** *United States*: Loscocco & Robinson 1989; Loscocco et al. 1991; PD Reynolds 1993; Fasci & Valdez 1998
No signif. difference						**NORTH AMERICA** *Canada*: Collins-Dodd et al. 2004 (various control variables); *United States*: Kalleberg & Leicht 1991 **OCEANIA** *Australia*: J Watson 2002 (several variables controlled)
Females more						

11.3.7.9. Sex Ratio in an Occupation Affecting Average Salary

Several studies have sought to determine if an occupation's sex ratio affects the average income of those employed in that occupation. As shown in Table 11.3.7.9, nearly all of these studies have concluded that as the proportion of men in an occupation increases, the average salaries in that occupation tend to be greater.

Table 11.3.7.9. Sex ratio in an occupation affecting average salary.

Nature of Any Difference						Postpubertal	
						Adult	
Increased pay as percent males increases						**NORTH AMERICA** *United States*: B Bergmann 1974; Bluestone 1974; M Stevenson 1975; P England & McLaughlin 1979; National Research Council 1981:54; Treiman & Hartmann 1981; P England 1982; Aldrich & Buchele 1986; JN Baron & Newman 1989; P England 1992; P England et al. 1992; Tomaskovic-Devey 1993; P England et al. 1994; England et al. 1996; Huffman & Velasco 1997	
No signif. difference						**NORTH AMERICA** *United States*: Filer 1989	
Increased pay as percent females increases							

11.3.7.10. Financial Well-Being

The two studies of sex differences in financial well-being both concluded that among the elderly males were better off than females (Table 11.3.7.10).

Table 11.3.7.10. Financial well-being.

Nature of Any Difference				Postpubertal	
				Adult	
Males more well-being				**ASIA** *China*: Gu & Liang 2000 (elderly) **NORTH AMERICA** *United States*: Umberson et al. 1992 (elderly)	
No signif. difference					
Females more well-being					

11.3.7.11. Property Ownership

One study among Hopi Indians concluded that women owned more property than did men (Table 11.3.7.11).

Table 11.3.7.11. Property ownership.

Nature of Any Difference						Postpubertal	
						Adult	
Males more							
No signif. difference							
Females more						**NORTH AMERICA** *United States*: CC Weisfeld et al. 1983:697 (Hopi)	

11.3.7.12. Financial Return From Education

The limited research surrounding which sex benefits in financial terms from each additional year of education received has been somewhat inconsistent, although most studies suggest that females benefit more than do males (Table 11.3.7.12).

Table 11.3.7.12. Financial return from education.

Nature of Any Difference					Postpubertal		Multiple Age Categories
						Adult	
Males higher						**NORTH AMERICA** *United States*: Gerhart & Rynes 1991 (among MBA graduates)	
No signif. difference							
Females higher						**ASIA** *India*: Duraisamy 2002 (college) **NORTH AMERICA** *United States*: Surette 2001:161 (among transfers from 2-year colleges)	**ASIA** *Indonesia*: Deolalikar 1993

11.3.8. Work at Home

Many surveys have been conducted to determine which gender is most involved in performing household chores. The nature of the housework sometimes includes cleaning, child rearing, food preparation, decorating, and yard maintenance. Most of the studies were conducted among married couples.

11.3.8.1. Performing Household Chores in General

Which gender is most likely to be involved in performing household chores? Especially when outside and/or construction chores are excluded, the answer appears to be very consistently in favor of females. As shown in Split-Table 11.3.8.1a, this generalization holds for young children with the exception of only a few studies that failed to identify a statistically significant difference.

Split-Table 11.3.8.1a. Performing household chores in general (prepubetal).

Nature of Any Difference	Prepubertal					
			Early Childhood	Childhood		
Males more						
No signif. difference			**ASIA** *Bangladesh*: Cain 1980* (rural)	**ASIA** *India*: Whiting & Edwards 1988* **NORTH AMERICA** *United States*: Duckett et al 1989*; Robinson & Bianchi 1997*		
Females more				**AFRICA** *Mahe Island*: M Benedict & Benedict 1982:261; *Nigeria*: Schildkrout 1978; Robson 2004*; *Rural Botswana*: Mueller 1984*; *Kenya*: Ember 1973 (Lue community) **ASIA** *Bangladesh*: Cain 1980* (rural); *India*: Saraswathi & Dutta 1988*; Skoufias 1994*; *Indonesia*: Nag et al. 1980* (rural Java); *Nepal*: Nag et al. 1980*(rural) **LATIN AMERICA** *Mexico*: Whiting & Edwards 1988* (rural) **NORTH AMERICA** *Canada*: Frederick 1995*; *United States*: Larson et al. 2001* (African-American) **OCEANIA** *Rural Philippines*: Evenson et al. 1980* **INTERNATIONAL** *Several Developing Countries*: Nieuwenhuys 1994		

For adolescents and adults, the findings have also been nearly unanimous in indicating that females are significantly more involved in performing inside household chores than males (Split-Table 11.3.8.1b). This holds even for couples in which both the husband and wife have full-time employment outside the home.

Split-Table 11.3.8.1b. Performing household chores in general (postpubertal).

Nature of Any Difference					Postpubertal		Multiple Age Categories
					Adolescent	Adult	
Males more					**AFRICA** *Nigeria*: Robson 2004:202* (house construction & repair)	**NORTH AMERICA** *United States*: Pleck 1985* (yard maintenance, home & auto repair)	
No signif. difference					**NORTH AMERICA** *United States*: Duckett et al. 1989*; Robinson & Bianchi 1997*		
Females more					**AFRICA** *Botswana*: Mueller 1984* (rural); *Nigeria*: Robson 2004:204* **ASIA** *Bangladesh*: Cain 1980* (rural); *Indonesia*: Nag et al. 1980* (rural Java); *Nepal*: Nag et al. 1980* (rural) **MIDDLE EAST** *India*: Saraswathi & Dutta 1988*; Skoufias 1994* **NORTH AMERICA** *Canada*: Frederick 1995*; *United States*: Cogle et al. 1982; Cogle & Tasker 1982; Sanik & Stafford 1985; Sanik & Stafford 1986; Benin & Edwards 1990 (still living with parents); Mauldin & Meeks 1990; Hilton & Haldeman 1991; Gager et al. 1999; Larson et al. 2001* (African-American) **OCEANIA** *Philippines*: Evenson et al. 1980* (rural)	**ASIA** *Japan*: Inoue & Ebara 1995; *Russia*: Cubbine & Vannoy 2004 (married & cohabitating couples); *Soviet Union*: Haavio-Mannila 1971*; Heitlinger 1979*; Yanowitch 1987:358; Du Plessix 1989 **EUROPE** *Britain*: Pahl 1984; L Morris 1990; Gershuny et al. 1994; O Sullivan 1996; Crompton 1997; O Sullivan 1997; O Sullivan 2000; *Czechoslovakia*: Heitlinger 1979*; *England*: Gervai et al. 1995* (married couples); *Finland*: Haavio-Mannila 1971*; *Hungary*: Gervai et al. 1995* (married couples); *Sweden*: Haavio-Mannila 1971*; L. Haas 1981; Calasanti & Bailey 1991*; Underlid 1996 (unemployed persons); Statistics Sweden 2000 **MIDDLE EAST** *Israel*: Kulik 2002 (elderly) **NORTH AMERICA** *Canada*: P Armstrong & Armstrong 1984; SM Shaw 1988; Douthitt 1989; Devereaux 1992; Frederick 1993; W. Clement & Myles 1994; Nakhaic 1995; C Jackson 1996; Davies & McAlpine 1998; S McFarlane et al. 2000; Tindall et al. 2003 (13 more hours per week); *United States*: M Kramer 1967; S Berk 1981 (cleaning); H Hartmann 1981; Brubaker & Hennon 1982 (full adult and elderly); CE Ross et al. 1983 (married couples); H Hartmann 1984; Coverman 1985; Pleck 1985*; Coverman & Sheley 1986; R Hertz 1986 (dull career couples); Shamir 1986 (married couples); Barnett & Baruch 1987 (cleaning); Berardo et al. 1987*; Piotrokowski et al. 1987 (elderly); Dorfman & Heckert 1988 (elderly); Gershuny & Robinson 1988; Kamo 1988; JP Robinson 1988*; DL Chambers 1989 (lawyers spouses); Hochschild & Machung 1989* (dual-earning couples); Szinovacz 1989 (elderly); Kalleberg & Rosenfeld 1990; Kibria et al. 1990; JE Olson et al. 1990; SL Blair & Lichter 1991 (duel-earning couples); Calasanti & Bailey 1991*; Ferree 1991 (time spent); Goldscheider & Waite 1991:189; Stafford & Canary 1991 (married couples); SL Blair & Johnson 1992 (married couples); Brines 1993; GA Hamilton & Seidman 1993 (following a heart attack); Marini & Shelton 1993*; Brines 1994; Manke et al. 1994 (time spent); Perry-Jenkins & Folk 1994 (dual-earning couples); Presser 1994 (duel-earning couples); South & Spizte 1994; Szinovacz & Harpster 1994 (elderly, married couples); Wiersma 1994; Pina & Bengston 1995 (elderly); S Coltrane 1996; GL Rose et al. 1996 (6 months after a heart attack); Hochschild 1997; PL Carr et al. 1998; JR Wilkie et al. 1998; JP Robinson & Godbey 1999; Bianchi et al. 2000; Colletti et al. 2000 (medical school professors); S Coltrane 2000; Cujec et al. 2000 (physicians); Greenstein 2000; Dempsey 2002; CE Sheffer et al. 2002; Keene & Quadagno 2004 **OCEANIA** *Australia*: Pressland & Antill 1987; B Wearing 1990; Bittman 1992; J Baxter 1993; K Dempsey 1997; Collis 1999; Bittman & Wajcman 2000; K Dempsey 2000; *New Zealand*: Keating & Little 1994 (elderly) **INTERNATIONAL** *Multiple Countries*: D'Amico 1986; Oakes & Almquist 1993:71 (child rearing); A.L. Kalleberg & Rosenfeld 1990; *Multiple European Countries*: C Fagan 2002 (hours per week in & outside the home); *Several Industrial Countries*: J. Baxter 1997; Gershuny & Sullivan 2003:215; Nordenmark 2004:237	**ASIA** *Soviet Union*: BG Rosenthal 1975:429 **MIDDLE EAST** *Israel*: Peres & Katz 1990; Izraeli 1992 **NORTH AMERICA** *United States*: KE Walker & Woods 1976; RA Berk & Fenstermaker Berk 1979; JP Robinson 1980; Daniels & Weingarten 1981; Gutek et al. 1981 (cleaning); Sanik 1981; Pleck 1985*; Berardo et al. 1987*; JP Robinson 1988*; Hochschild & Machung 1989*; L Thompson & Walker 1989 (cleaning); Feree 1990 (cleaning); RC Barnett & Marshall 1991; Marini & Shelton 1993:371*; Presser 1993; Tenbrunsel et al. 1995 **OCEANIA** *Australia*: J Harper & Richards 1979; J Baxter 1988

11.3.8.2. Trends in Performing Household Chores

According to one study, while the extent to which females are involved in household chores compared to males is still substantial, the trend in industrialized countries has been toward a lessening of the inequality (Table 11.3.8.2).

Table 11.3.8.2. Trends in performing household chores.

Nature of Any Difference	Citations
Increasing the sex difference	
No signif. change	
Decreasing the sex difference	**INTERNATIONAL** *Several Industrialized Countries*: Gershuny & Sullivan 2003:215

11.3.8.3. Involvement in Food Preparation

As summarized in Table 11.3.8.3, a few studies have sought to determine which sex is most involved in cooking and other forms of food preparation. One of these was a cross-cultural comparison involving 163 countries. This study determined that in nearly all of these countries, food preparation was predominantly a female activity.

Table 11.3.8.3. Involvement in food preparation.

Nature of Any Difference	Prepubertal				Postpubertal		Multiple Age Categories
				Childhood		Adult	
Males more							**INTERNATIONAL** *Multiple Preliterate Societies*: Murdock & Provost 1973:207* (vegetal foods 4/174); Murdock & Provost 1973:207* (preservation of meat and fish, 20/66); Murdock & Provost 1973:207* (preparation of drinks, 18/91); Murdock & Provost 1973:207* (cooking, 2/184)
No signif. difference							**INTERNATIONAL** *Multiple Societies*: C Russell & Russell 1971:68* (5/163 societies); *Multiple Preliterate Societies*: Murdock & Provost 1973:207* (vegetal foods 4/174); Murdock & Provost 1973:207* (preservation of meat and fish, 3/66); Murdock & Provost 1973:207* (preparation of drinks, 4/91); Murdock & Provost 1973:207* (cooking, 2/184)
Females more				**EUROPE** *Britain*: S Johnson 1987:27		**NORTH AMERICA** *United States*: Rytina & Bianchi 1984:16	**INTERNATIONAL** *Multiple Societies*: C Russell & Russell 1971:68* (158/163 societies); *Multiple Preliterate Societies*: Murdock & Provost 1973:207* (vegetal foods 166/174); Murdock & Provost 1973:207* (preservation of meat and fish, 43/66); Murdock & Provost 1973:207* (preperation of drinks, 69/91); Murdock & Provost 1973:207* (cooking, 180/184)

11.3.8.4. Involvement in Flower Preparation and Planting

Based on self-reports, one study concluded that females are more involved in planting flowers and preparing them in various ways for display (Table 11.3.8.4).

Table 11.3.8.4. Involvement in flower preparation and planting.

Nature of Any Difference	Prepubertal					
				Childhood		
Males more						
No signif. difference						
Females more				**EUROPE** *Britain*: S Johnson 1987:27		

11.3.8.5. Involvement in Knitting, Sewing, or Making Clothes

The sex that is most likely to be involved in knitting and sewing has been investigated by a few studies, one of which examined 107 societies. In the vast majority of societies, females appear to be more involved in such activities than males (Table 11.3.8.5).

Table 11.3.8.5. Involvement in knitting, sewing, or making clothes.

Nature of Any Difference	Prepubertal						Multiple Age Categories
				Childhood			
Males more							**INTERNATIONAL** *Multiple Preliterate Societies*: Murdock & Provost 1973:207* (loom weaving, 24/88); Murdock & Provost 1973:207* (manufacture of clothing, 20/122)
No signif. difference							**INTERNATIONAL** *Multiple Societies*: C Russell & Russell 1971:68* (12/107 societies); *Multiple Preliterate Societies*: Murdock & Provost 1973:207* (loom weaving, 6/88); Murdock & Provost 1973:207* (manufacture of clothing, 11/122)
Females more				**EUROPE** *Britain*: S Johnson 1987:27			**OCEANIA** *Philippines*: Floro & Schaefer 1998:88 **INTERNATIONAL** *Multiple Societies*: C Russell & Russell 1971:68* (95/107 societies); *Multiple Preliterate Societies*: Murdock & Provost 1973:207* (loom weaving, 58/88); Murdock & Provost 1973:207* (manufacture of clothing, 91/122)

11.3.8.6. Parenting and Childcare Activities

According to all available research, females are more likely to be involved in providing child care than is the case for males (Table 11.3.8.6). This is true for both humans and other primates.

Table 11.3.8.6. Parenting and childcare activities.

Nature of Any Difference					Postpubertal		
				Childhood	Adolescent	Adult	
Greater by males							
No signif. difference							
Greater by females				**PRIMATE (EXCEPT APE)** *Vervet Monkey*: MJ Raleigh et al. 1979 (in captivity)	**AFRICA** *Nigeria*: Robson 2004:203 **PRIMATE (EXCEPT APE)** *Vervet Monkey*: Lancaster 1971; *Squirrel Monkey*: JD Baldwin 1969; JD Baldwin & Baldwin 1974; *Rhesus Macaque*: Chamove et al. 1967	**EUROPE** *Britain*: O Sullivan 2000; *England*: Gervai et al. 1995* (married couples); *Hungary*: Gervai et al. 1995* (married couples) **NORTH AMERICA** *United States*: Elrod & Crase 1980; Hochschild & Machung 1989 (when both parents are employed full-time); L Thompson & Walker 1989; LLE Anderson & Branson 1991; Biernat & Wortman 1991 (when both parents are employed full-time); RR Peterson & Gerson 1992 (dual-earning couples); Demo & Acock 1993; S Coltrane 1996; SM Bianchi et al. 2000; Keene & Quadagno 2004 **OCEANIA** *Australia*: Bittman 1992; J Baxter 1993 **INTERNATIONAL** *Worldwide*: Oakes & Almquist 1993:71	

11.3.8.7. Nurturing and Caring for Family Members

All of the studies on adults who devote time to providing services and care for family members (usually those who are elderly) have concluded that females do so to a greater extent than do males (Table 11.3.8.7).

Table 11.3.8.7. Nurturing and caring for family members.

Nature of Any Difference					Postpubertal	
					Adult	
Males more					**INTERNATIONAL** *Multiple Preliterate Societies*: Murdock & Provost 1973:207* (care of small animals, 27/88)	
No signif. difference					**INTERNATIONAL** *Multiple Preliterate Societies*: Murdock & Provost 1973:207* (care of small animals, 14/88)	
Females more					**NORTH AMERICA** *United States*: Fitting et al. 1986 (caring for elderly); Montemayor 1986 (caregiver of family); Finley 1989 (caring for ill elderly); Montgomery & Kamo 1989 (caring for ill elderly); Dwyer & Coward 1992 (caring for ill elderly); Larson & Richards 1994 (caregiver of family); Kramer & Kipnis 1995 (caring for ill elderly); Neal et al. 1997 (caring for ill elderly) **INTERNATIONAL** *Multiple Preliterate Societies*: Murdock & Provost 1973:207* (care of small animals, 56/88)	

11.3.9. Work Productivity and Accolades

Research having to do with how productive individuals have been professionally is usually based on what they have achieved in the way of publications or in terms of praise they obtained from others. Findings are reviewed below.

11.3.9.1. Achieving Eminence/Prominence in One's Occupation

Studies that have been undertaken to determine which gender is more likely to achieve eminence in their profession have all concluded that males surpass females in this regard (Table 11.3.9.1).

Table 11.3.9.1. Achieving eminence/prominence in one's occupation.

Nature of Any Difference						Multiple Age Categories
Males more						**ASIA** *China*: Gang & Guiyang 2000 **NORTH AMERICA** *United States*: Terman & Oden 1947; A Bayer & Astin 1975; H Zuckerman & Cole 1975; Pyle 1996 (listed in Who's Who); Zweigenhaft & Domhoff 1998 (listed in Who's Who); McDermott 2002 (listed in Who's Who)
No signif. difference						
Females more						

11.3.9.2. Publication Rates and Scholarly Productivity

The extent to which males and females publish or produce other scholarly works, typically among scientists and academics, has been investigated by numerous studies. All but two of these studies have concluded that males publish at higher rates than do females; the exceptions found no significant difference (Table 11.3.9.2).

Table 11.3.9.2. Publication rates and scholarly productivity.

Nature of Any Difference					Postpubertal		
						Adult	
Males more						**EUROPE** *Croatia*: Kyvik & Teigen 1996; Prpic 2002 **INTERNATIONAL** *Multiple Developing Countries*: Campion & Shrum 2004:469 (scientists) **MIDDLE EAST** *India*: Goel 2002 **NORTH AMERICA** *United States*: Thorndike 1914; Anderson & Goodenough 1935; F Clemente 1973; JR Cole & Cole 1973 (college professors & scientists); BF Reskin 1978; JR Cole 1979; CH Persell 1983; RJ Cole & Zuckerman 1984; Creswell 1985; MF Fox & Faver 1985; JS Long 1990; S Cole & Singer 1991:278; JS Long 1992; McElrath 1992:274; JM McDowell & Smith 1992 (college professors); JS Long et al. 1993; MF Fox 1995 (scientists); KB Ward & Grant 1995 (college professors); Xie & Shauman 1998; S Stack 2004 (science professors, number of children in family controlled)	
No signif. difference						**NORTH AMERICA** *United States*: Widmayer & Rabe 1990 (criminology/criminal justice); S Stack 2002	
Females more							

11.3.9.3. Being a Great (Well Known) Artist or Musician

Only one study assessed the sex ratio among individuals who were considered "great musicians" and it concluded that more males were so classified than was the case for females (Table 11.3.9.3).

Table 11.3.9.3. Being a great (well known) artist or musician.

Nature of Any Difference	Citation
More males	**ASIA** *Soviet Union*: Boelza 1943
No signif. difference	
More females	

Chapter 12

ATTITUDES AND ACTIONS TOWARD OTHERS IN RELATIONSHIP TO THEIR GENDER

In the the preceding eleven chapters, the focus has been on how males and females differ regarding traits ranging from anatomy, emotions, attitudes, abilities, and behavior. The present chapter essentially turns the focus around in order to examine how people think about or treat others on the basis of whether the person being thought about or being acted toward is a male or a female.

12.1

ATTITUDES AND BELIEFS SURROUNDING GENDER

The results of studies pertaining to people's attitudes towards others based on whether the other person in a male or female are examined in the following tables.

Beliefs (Stereotypes) About Gender Differences

Considerable research has been conducted over the years on how people of both sexes think of males and females, particularly regarding differences in behavior. When gender differences are recognized by people, they are often referred to as "sex stereotypes". However, if what people recognize as sex differences that are only true "on average", stereotypes are probably best considered *generalizations*. The following tables present the results of people's sex stereotypes or generalizations.

12.1.1.1. Beliefs (Stereotypes) About the Extent to Which Males and Females Differ

In a few surveys, people were asked to what extent do they perceive the sexes to be different from one another. As shown in Table 12.1.1.1, the findings have been mixed regarding any tendency for males or females to believe that the sexes do differ.

Table 12.1.1.1. Beliefs (stereotypes) about the extent to which males and females differ.

Nature of Any Difference				Postpubertal		Multiple Age Categories
					Adult	
Males perceive greater differences					**NORTH AMERICA** *United States*: Frey & Ruble 1992 **INTERNATIONAL** *Multiple Countries*: Williams & Best 1982	
No signif. difference						**MIDDLE EAST** *Israel*: Kulik 2002 (about occupations) **NORTH AMERICA** *United States*: BA Riemer & Visio 2003 (about sports)
Females perceive greater differences					**NORTH AMERICA** *United States*: Babladelis 1973 (college)	

12.1.1.2. Beliefs (Stereotypes) About Academic Achievement

One study among school teachers failed to reveal any beliefs that boys or girls were better academically (Table 12.1.1.2).

Table 12.1.1.2. Beliefs (stereotypes) about academic achievement.

Nature of Any Difference					Postpubertal	
						Adult
Males perceived more						
No signif. difference						**EUROPE** *Britain*: S Jones & Myhill 2004 (school teachers, interviews)
Females perceived more						

12.1.1.3. Beliefs (Stereotypes) About Having More Accidental Injuries

In one study, males were found to be stereotyped as having more accidental injuries than females (Table 12.1.1.3).

Table 12.1.1.3. Beliefs (stereotypes) about having more accidental injuries.

Nature of Any Difference					Postpubertal	
						Adult
Males perceived as having more						**EUROPE** *Britain*: S Macintyre et al. 2005:463
No signif. difference						
Females perceived as having more						

12.1.1.4. Beliefs (Stereotypes) About Being Adaptable

Females were stereotyped as being more adaptable than males according to the one available study (Table 12.1.1.4).

Table 12.1.1.4. Beliefs (stereotypes) about being adaptable.

Nature of Any Difference					Postpubertal	
						Adult
Males perceived as more						
No signif. difference						
Females perceived as more						**EUROPE** *Norway*: JE Williams & Best 1977 (college)

12.1.1.5. Beliefs (Stereotypes) About Being Affectionate

Table 12.1.1.5 shows that in the one available study, females were thought to be more affectionate than males.

Table 12.1.1.5. Beliefs (stereotypes) about being affectionate.

Nature of Any Difference					Postpubertal	
						Adult
Males perceived as more						
No signif. difference						
Females perceived as more						**NORTH AMERICA** *United States*: Werner & LaRussa 1985 (college)

12.1.1.6. Beliefs (Stereotypes) About Being Aggressive

Several studies have asked subjects which sex they thought was more prone toward aggression and physical fighting. In all cases, males were so perceived to a greater degree than females (Table 12.1.1.6).

Table 12.1.1.6. Beliefs (stereotypes) about being aggressive.

Nature of Any Difference					Postpubertal		
			Early Childhood	Childhood	Adolescent	Adult	
Males believed to be more			**NORTH AMERICA** *United States*: RSL Mills & Rubin 1990 (by parents); RSL Mills & Rubin 1992 (by mothers); PD Hastings & Rubin 1999 (by mothers)	**NORTH AMERICA** *United States*: Cowan & Hoffman 1986 (by adults); DL Clay et al. 1996* (parent reports)	**NORTH AMERICA** *United States*: DL Clay et al. 1996* (parent reports)	**NORTH AMERICA** *United States*: Sherriffs & McKee 1957:453 (college raters of persons generally); Broverman et al. 1972; HH Kelley et al. 1978; Eagly & Steffen 1984; Werner & LaRussa 1985 (college); Lyons & Serbin 1986 (college raters of children); MB Harris & Knight-Bonhoff 1996 (Anglo & Hispanic)	
No signif. difference							
Females believed to be more							

12.1.1.7. Beliefs (Stereotypes) About Being Aloof

The tendency to be aloof, according to one study, is thought to be more characteristic of females than of males (Table 12.1.1.7).

Table 12.1.1.7. Beliefs (stereotypes) about being aloof.

Nature of Any Difference						Postpubertal	
						Adult	
Males believed to be more							
No signif. difference							
Females believed to be more						**EUROPE** *Norway*: JE Williams & Best 1977 (college)	

12.1.1.8. Beliefs (Stereotypes) About Being Ambitious

According to three studies, males were believed to be more ambitious than females (Table 12.1.1.8).

Table 12.1.1.8. Beliefs (stereotypes) about being ambitious.

Nature of Any Difference						Postpubertal	
						Adult	
Males perceived as more						**EUROPE** *Netherlands*: Visser 1996:593 (college, career oriented) **NORTH AMERICA** *United States*: Sherriffs & McKee 1957:453 (college); Werner & LaRussa 1985 (college)	
No signif. difference							
Females perceived as more							

12.1.1.9. Beliefs (Stereotypes) About Being Artistic

The one located study concluded that females were stereotyped as being more artistic than males (Table 12.1.1.9).

Table 12.1.1.9. Beliefs (stereotypes) about being artistic.

Nature of Any Difference						Postpubertal	
						Adult	
Males perceived as more							
No signif. difference							
Females perceived as more						**NORTH AMERICA** *United States*: Werner & LaRussa 1985 (college)	

12.1.1.10. Beliefs (Stereotypes) About Being Attractive/Beautiful

The gender that is considered more attractive or beautiful is females according to the available research (Table 12.1.1.10).

Table 12.1.1.10. Beliefs (stereotypes) about being attractive/beautiful.

Nature of Any Difference						Postpubertal
						Adult
Males thought to be more						
No signif. difference						
Females thought to be more						**NORTH AMERICA** *United States*: Oliver-Rodriguez et al. 1999:179 (considered female face more attractive by both sex); de Munck et al. 2002:238* **OCEANIA** *Sri Lanka*: de Munck et al. 2002:238*

12.1.1.11. Beliefs (Stereotypes) About Being Autonomous

According to one study, males were stereotyped as being more autonomous than females (Table 12.1.1.11).

Table 12.1.1.11. Beliefs (stereotypes) about being autonomous.

Nature of Any Difference						Postpubertal
						Adult
Males thought to be more						**NORTH AMERICA** *United States*: Canetto et al. 1995 (elderly)
No signif. difference						
Females thought to be more						

12.1.1.12. Beliefs (Stereotypes) About Being Boastful

Two studies concluded that males are stereotyped as being more likely to boast than are females (Table 12.1.1.12).

Table 12.1.1.12. Beliefs (stereotypes) about being boastful.

Nature of Any Difference						Postpubertal
						Adult
Males perceived as more						**NORTH AMERICA** *United States*: Sherriffs & McKee 1957:453 (college); Werner & LaRussa 1985 (college)
No signif. difference						
Females perceived as more						

12.1.1.13. Beliefs (Stereotypes) About Being Bossy/Demanding

Research surrounding which sex was perceived to be more demanding or bossy has reached contradictory conclusions (Table 12.1.1.13).

Table 12.1.1.13. Beliefs (stereotypes) about being bossy/demanding.

Nature of Any Difference						Postpubertal
						Adult
Males perceived as more						**NORTH AMERICA** *United States*: Werner & LaRussa 1985 (college, bossy)
No signif. difference						
Females perceived as more						**EUROPE** *Norway*: JE Williams & Best 1977 (college, nagging)

12.1.1.14. Beliefs (Stereotypes) About Participating in Boxing

One study concluded that males were perceived as being more interested in participating in boxing than was the case for females (Table 12.1.1.14).

Table 12.1.1.14. Beliefs (stereotypes) about participating in boxing.

Nature of Any Difference					Postpubertal	
					Adolescent	
Males perceived as more					**NORTH AMERICA** *United States*: BA Riemer & Visio 2003:200	
No signif. difference						
Females perceived as more						

12.1.1.15. Beliefs (Stereotypes) About Being Calm

Table 12.1.1.15 shows that one study found no significant perceived sex difference regarding which sex was considered calmer.

Table 12.1.1.15. Beliefs (stereotypes) about being calm.

Nature of Any Difference					Postpubertal		
						Adult	
Males perceived as more							
No signif. difference						**NORTH AMERICA** *United States*: Werner & LaRussa 1985 (college)	
Females perceived as more							

12.1.1.16. Beliefs (Stereotypes) About Being Cheerful

A study of stereotyped cheerfulness concluded that this was thought to be more characteristic of females than of males (Table 12.1.1.16).

Table 12.1.1.16. Beliefs (stereotypes) about being cheerful.

Nature of Any Difference					Postpubertal		
						Adult	
Males perceived as more							
No signif. difference							
Females perceived as more						**NORTH AMERICA** *United States*: Werner & LaRussa 1985 (college)	

12.1.1.17. Beliefs (Stereotypes) About Clear Thinking

According to one study, neither sex was perceived to be more clear thinking than the other (Table 12.1.1.17).

Table 12.1.1.17. Beliefs (stereotypes) about clear thinking.

Nature of Any Difference					Postpubertal		
						Adult	
Males perceived as more							
No signif. difference						**NORTH AMERICA** *United States*: Werner & LaRussa 1985 (college)	
Females perceived as more							

12.1.1.18. Beliefs (Stereotypes) About Being Competent

The two studies of beliefs about which sex was generally competent both concluded that males were more so than females (Table 12.1.1.18).

Table 12.1.1.18. Beliefs (stereotypes) about being competent.

Nature of Any Difference					Postpubertal		
						Adult	
Males perceived as more						**NORTH AMERICA** *United States*: W Wood & Karten 1986; M Conway & Vartanian 2000	
No signif. difference							
Females perceived as more							

12.1.1.19. Beliefs (Stereotypes) About Being Critical or Finding Fault

According to one study, females were perceived as being more likely to find fault with others than was the case for males (Table 12.1.1.19).

Table 12.1.1.19. Beliefs (stereotypes) about being critical or finding fault.

Nature of Any Difference						Postpubertal	
						Adult	
Males perceived as more							
No signif. difference							
Females perceived as more						**EUROPE** *Norway*: JE Williams & Best 1977 (college)	

12.1.1.20. Beliefs (Stereotypes) About Playing Computer Games

A study of stereotypes concerning which sex was most likely to be interested in playing computer games concluded that males were thought to do so more than females (Table 12.1.1.20).

Table 12.1.1.20. Beliefs (stereotypes) about playing computer games.

Nature of Any Difference							Multiple Age Categories
Males perceived as more interested							**NORTH AMERICA** *United States*: Cassell & Jenkins 1998 (by both sexes)
No signif. difference							
Females perceived as more interested							

12.1.1.21. Beliefs (Stereotypes) About Concern for Others

The one available study of beliefs about sex differences in people's concerns for others concluded that company managers believed that males had more concern than did females (Table 12.1.1.21).

Table 12.1.1.21. Beliefs (stereotypes) about concern for others.

Nature of Any Difference						Postpubertal	
						Adult	
Considered more for males						**NORTH AMERICA** *United States*: Heilman et al. 1995 (by company managers)	
No signif. difference							
Considered more for females							

12.1.1.22. Beliefs (Stereotypes) About Being in Control

One study sought to determine if a sex difference existed in who was considered to be more "in control" when catastrophes occur. This study concluded that males were so perceived to a greater extent than females (Table 12.1.1.22).

Table 12.1.1.22. Beliefs (stereotypes) about being in control.

Nature of Any Difference						Postpubertal	
						Adult	
Males perceived as more						**EUROPE** *Netherlands*: Visser 1996:593 (college)	
No significant difference							
Females perceived as more							

12.1.1.23. Beliefs (Stereotypes) About Being Cooperative

One study concluded that females were stereotyped as being more cooperative than males (Table 12.1.1.23).

Table 12.1.1.23. Beliefs (stereotypes) about being cooperative.

Nature of Any Difference						Postpubertal	
						Adult	
Males perceived as more							
No signif. difference							
Females perceived as more						**NORTH AMERICA** *United States*: Werner & LaRussa 1985 (college)	

12.1.1.24. Beliefs (Stereotypes) About Being Courageous

The tendency to be courageous was believed to be more common among males than among females according to the one available study (Table 12.1.1.24).

Table 12.1.1.24. Beliefs (stereotypes) about being courageous.

Nature of Any Difference					Postpubertal	
						Adult
Males perceived as more						**NORTH AMERICA** *United States*: Werner & LaRussa 1985 (college)
No signif. difference						
Females perceived as more						

12.1.1.25. Beliefs (Stereotypes) About Contracting Coronary Heart Disease

The available research has concluded that males are perceived as more likely than females to suffer from coronary heart disease (Table 12.1.1.25).

Table 12.1.1.25. Beliefs (stereotypes) about contracting coronary heart disease.

Nature of Any Difference					Postpubertal	
						Adult
Males perceived as more						**EUROPE** *Britain*: Emslie et al. 2001a **NORTH AMERICA** *United States*: Ruston et al. 1998; Emslie et al. 2001b
No signif. difference						
Females perceived as more						

12.1.1.26. Beliefs (Stereotypes) About Crying

The one available study of sex stereotypes in crying concluded that females are more often thought to cry than males (Table 12.1.1.26).

Table 12.1.1.26. Beliefs (stereotypes) about crying.

Nature of Any Difference	Prepubertal					
		Toddler				
Males perceived as more						
No significant difference						
Females perceived as more		**NORTH AMERICA** *United States*: Kuhn et al. 1978				

12.1.1.27. Beliefs (Stereotypes) About Being Curious

Curiosity was stereotyped as being more characteristic of females than of males, according to one study (Table 12.1.1.27).

Table 12.1.1.27. Beliefs (stereotypes) about being curious.

Nature of Any Difference					Postpubertal	
						Adult
Males perceived as more						
No signif. difference						
Females perceived as more						**NORTH AMERICA** *United States*: Werner & LaRussa 1985 (college)

12.1.1.28. Beliefs (Stereotypes) About Being Assigned Custody of Children Post-Divorce

Most people believe that females are more likely than males to be assigned custody of children following divorce, according to the one available study (Table 12.1.1.28).

Table 12.1.1.28. Beliefs (stereotypes) about being assigned custody of children post-divorce.

Nature of Any Difference	Postpubertal
	Adult
Males perceived as more	
No signif. difference	
Females perceieved as more	**NORTH AMERICA** *United States*: CD Hoffman & Moon 2000

12.1.1.29. Beliefs (Stereotypes) About Being Adventurous, Daring, or Prone to Risk Taking

Research in which subjects have been asked to rate each sex according to how prone they are to take risks and to be daring has concluded that males are perceived as being more so than females (Table 12.1.1.29).

Table 12.1.1.29. Beliefs (stereotypes) about being adventurous, daring, or prone to risk taking.

Nature of Any Difference	Postpubertal
	Adult
Males perceived as more	**EUROPE** *Britain*: B Read et al. 2001 (college, conclusions in written essays); *Netherlands*: Visser 1996:593 (college, adventurous) **NORTH AMERICA** *United States*: Sherriffs & McKee 1957:453 (college); Werner & LaRussa 1985 (college) Zeff et al. 1994:761 (college)
No signif. difference	
Females perceieved as more	

12.1.1.30. Beliefs (Stereotypes) About Being Deliberate

The one available study that sought to determine of one sex was thought to be more "deliberate" failed to reveal any significant difference (Table 12.1.1.30).

Table 12.1.1.30. Beliefs (stereotypes) about being deliberate.

Nature of Any Difference	Postpubertal
	Adult
Males perceived as more	
No signif. difference	**NORTH AMERICA** *United States*: Werner & LaRussa 1985 (college)
Females perceived as more	

12.1.1.31. Beliefs (Stereotypes) About Being Depressed

Two studies asked people which sex is more prone to depression. Neither study found a significant difference in this regard (Table 12.1.1.31).

Table 12.1.1.31. Beliefs (stereotypes) about being depressed.

Nature of Any Difference	Postpubertal	Multiple Age Categories
	Adult	
Males perceived as more		
No signif. difference	**NORTH AMERICA** *United States*: EA Plant et al. 2000	**NORTH AMERICA** *United States*: Fabes & Martin 1991
Females perceived as more		

12.1.1.32. Beliefs (Stereotypes) About Being Disciplined Physically

According to two studies, males were perceived as being more likely to receive physical discipline than were females (Table 12.1.1.32).

Table 12.1.1.32. Beliefs (stereotypes) about being disciplined physically.

Nature of Any Difference							Multiple Age Categories
Considered more appropriate for males							**NORTH AMERICA** *United States*: Zussman 1978; MA Barnett et al. 1996 (both sexes)
No signif. difference							
Considered more appropriate for females							

12.1.1.33. Beliefs (Stereotypes) About Discrimination

One study concluded that males were perceived as being more likely than females to discriminate on the basis of sex (Table 12.1.1.33).

Table 12.1.1.33. Beliefs (stereotypes) about discrimination.

Nature of Any Difference					Postpubertal		
						Adult	
Males percieved as more likely						**NORTH AMERICA** *United States*: RS Baron et al. 1991 (college, discriminate on the basis of sex)	
No signif. difference							
Females perceived as more likely							

12.1.1.34. Beliefs (Stereotypes) About Dominance and Status/Leadership

As shown in Table 12.1.1.34, most studies have found males are considered more dominant and of higher status than females. However, a few exceptional studies were found regarding dominance in certain specialized social realms, such as the home.

Table 12.1.1.34. Beliefs (stereotypes) about dominance and status/leadership.

Nature of Any Difference	Prepubertal				Postpubertal		Multiple Age Categories
			Early Childhood	Childhood		Adult	
Males perceived as more			**NORTH AMERICA** *United States*: Fuxloch 1930 (leadership characteristic)	**NORTH AMERICA** *United States*: S Smith 1939		**EUROPE** *Netherlands*: Visser 1996:593 (college) **NORTH AMERICA** *United States*: Sherriffs & McKee 1957:453 (college); VE Schein 1973 (leader, by both sexes); RW Rice et al. 1977 (military cadets); Eagly & Wood 1982; Werner & LaRussa 1985 (college); W Wood & Karten 1986; Branscombe & Smith 1990; Pratto & Bargh 1991 (college); Dember et al. 1993; Felmlee 1994 (romantic partners); Boldy et al. 2001 (leader for military trainees by both sexes); Heilman 2001 (leader, by both sexes); VE Schein 2001 (managers); GN Powell et al. 2002 (managers); Lawless 2004	
No signif. difference						**NORTH AMERICA** *United States*: Chemers et al. 2000 (military cadets); MS Morgan 2004 (military cadets)	
Females perceived as more						**NORTH AMERICA** *United States*: J Adams et al. 1980 (military cadets, according to neutral 3rd party observers); Biernat & Kobrynowicz 1997; Biernat & Fuegen 2001	**NORTH AMERICA** *United States*: Costrich et al. 1975

12.1.1.35. Beliefs (Stereotypes) About Being Dreamy

Females were believed to be more dreamy than males according to the one study located on this topic (Table 12.1.1.35).

Table 12.1.1.35. Beliefs (stereotypes) about being dreamy.

Nature of Any Difference					Postpubertal		
						Adult	
Males perceived as more							
No signif. difference							
Females perceived as more						**NORTH AMERICA** *United States*: Werner & LaRussa 1985 (college)	

12.1.1.36. Beliefs (Stereotypes) About Being Effeminate

Being effeminate is thought to be more characteristic of females than of males according to two studies (Table 12.1.1.36).

Table 12.1.1.36. Beliefs (stereotypes) about being effeminate.

Nature of Any Difference	Postpubertal
	Adult
Males perceived as more	
No signif. difference	
Females perceived as more	**EUROPE** *Norway*: JE Williams & Best 1977 (college) **NORTH AMERICA** *United States*: Werner & LaRussa 1985 (college)

12.1.1.37. Beliefs (Stereotypes) About Being Angry

Studies undertaken to determine if one sex was perceived as exhibiting greater emotional anger than the other have all concluded that this trait is perceived as being greater in males than in females (Table 12.1.1.37).

Table 12.1.1.37. Beliefs (stereotypes) about being angry.

Nature of Any Difference	Prepubertal	Postpubertal	Multiple Age Categories
	Early Childhood	Adult	
Males perceived as more	**NORTH AMERICA** *United States*: Birnbaum et al. 1980; Birnbaum 1983; Karbon et al. 1992	**NORTH AMERICA** *United States*: Birnbaum & Croll 1984 (young); JT Johnson & Shulman 1988 (young); Fabes & Martin 1991	**NORTH AMERICA** *United States*: Fabes & Martin 1991; Lutz 1996
No signif. difference			
Females perceived as more			

12.1.1.38. Beliefs (Stereotypes) About the Emotion of Depression or Sadness

Two studies concluded that females were perceived as more likely than males to exhibit feelings of sadness (Table 12.1.1.38).

Table 12.1.1.38. Beliefs (stereotypes) about the emotion of depression or sadness.

Nature of Any Difference	Multiple Age Categories
Males perceived as more	
No signif. difference	
Females perceived as more	**NORTH AMERICA** *United States*: Fabes & Martin 1991 (sadness); JT Spence & Buckner 2000 (emotionally expressive)

12.1.1.39. Beliefs (Stereotypes) About Being Emotionally Expressive

Table 12.1.1.39 indicates that females are perceived as being more likely than males to express their emotional feelings. This conclusion is consistent with a generalization to the same effect reached by Eagly and Wood (1991).

Table 12.1.1.39. Beliefs (stereotypes) about being emotionally expressive.

Nature of Any Difference	Postpubertal
	Adult
Males perceived as more	
No signif. difference	
Females perceived as more	**EUROPE** *Netherlands*: Visser 1996:593 (college); Timmers et al. 2003 (college) **NORTH AMERICA** *United States*: Broverman et al. 1972; Hesselbart 1977 (especially positive emotions); Ruble 1983; SA Shields 1984b; Werner & LaRussa 1985 (college); JT Johnson & Shulman 1988; Fabes & Martin 1991 (college, especially positive emotions); Dember et al. 1993; M Grossman & Wood 1993 (college)

12.1.1.40. Beliefs (Stereotypes) About the Emotion of Worry/Anxiety

One study concluded that females were more often stereotyped as prone to worry and anxiety than was the case for males (Table 12.1.1.140).

Table 12.1.1.40. Beliefs (stereotypes) about the emotion of worry.

Nature of Any Difference	Postpubertal
	Adult
Males perceived as more	
No signif. difference	
Females perceived as more	**NORTH AMERICA** *United States*: Werner & LaRussa 1985 (college); Stavosky & Borkovec 1987 (worrying)

12.1.1.41. Beliefs (Stereotypes) About Being Efficient

The word efficiency can obviously be interpreted in various ways. That fact notwithstanding, the one study that included "efficient" in their list of possible stereotypes concluded that males were perceived as being more efficient than females (Table 12.1.1.41).

Table 12.1.1.41. Beliefs (stereotypes) about being efficient.

Nature of Any Difference	Postpubertal
	Adult
Males perceived as more	**EUROPE** *Norway*: JE Williams & Best 1977 (college)
No signif. difference	
Females perceived as more	

12.1.1.42. Beliefs (Stereotypes) About Enjoying Team Sports

According to one study, males are thought by most people to enjoy team sports more than individual sports (Table 12.1.1.42).

Table 12.1.1.42. Beliefs (stereotypes) about enjoying team sports.

Nature of Any Difference	Postpubertal
	Adult
Males perceived as more	**NORTH AMERICA** *United States*: McCauley 1995:236 (college)
No signif. difference	
Females perceived as more	

12.1.1.43. Beliefs (Stereotypes) About Being Excitable

The one available study of how the sexes are stereotyped with regard to excitability concluded that females were thought to be more so than males (Table 12.1.1.43).

Table 12.1.1.43. Beliefs (stereotypes) about being excitable.

Nature of Any Difference	Postpubertal
	Adult
Males perceived as more	
No significant difference	
Females perceived as more	**NORTH AMERICA** *United States*: Werner & LaRussa 1985 (college)

12.1.1.44. Beliefs (Stereotypes) About Being Enthusiastic

Females were thought to generally be more enthusiastic than males in the one available study located on this topic (Table 12.1.1.44).

Table 12.1.1.44. Beliefs (stereotypes) about being enthusiastic.

Nature of Any Difference	Postpubertal
	Adult
Males perceived as more	
No signif. difference	
Females perceived as more	**NORTH AMERICA** *United States*: Werner & LaRussa 1985 (college)

12.1.1.45. Beliefs (Stereotypes) About Being Fair-Minded

The two available studies of sex stereotypes surrounding fair-mindedness came to opposite conclusions (Table 12.1.1.45).

Table 12.1.1.45. Beliefs (stereotypes) about being fair-minded.

Nature of Any Difference	Postpubertal
	Adult
Males perceived as more	**EUROPE** *Norway*: JE Williams & Best 1977 (college)
No signif. difference	
Females perceived as more	**NORTH AMERICA** *United States*: Werner & LaRussa 1985 (college)

12.1.1.46. Beliefs (Stereotypes) About Being Family Oriented

According to the one available study, females were stereotyped as being more family oriented than males (Table 12.1.1.46).

Table 12.1.1.46. Beliefs (stereotypes) about being family oriented.

Nature of Any Difference	Postpubertal
	Adult
Males thought to be more	
No signif. difference	
Females thought to be more	**EUROPE** *Netherlands*: Visser 1996:593 (college)

12.1.1.47. Beliefs (Stereotypes) About Being Fearful

Two studies concluded that females were stereotyped as being more fearful than males (Table 12.1.1.47).

Table 12.1.1.47. Beliefs (stereotypes) about being fearful.

Nature of Any Difference		Postpubertal
	Early Childhood	Adult
Males thought to be more		
No signif. difference		
Females thought to be more	**NORTH AMERICA** *United States*: Birnbaum et al. 1980	**NORTH AMERICA** *United States*: Sherriffs & McKee 1957:453 (college)

12.1.1.48. Beliefs (Stereotypes) About Being Feminine

It is not surprising to note that the sex that was stereotyped as being more feminine was the female sex (Table 12.1.1.48).

Table 12.1.1.48. Beliefs (stereotypes) about being feminine.

Nature of Any Difference	Postpubertal
	Adult
Males thought to be more	
No signif. difference	
Females thought to be more	**NORTH AMERICA** *United States*: Sherriffs & McKee 1957:453 (college)

12.1.1.49. Beliefs (Stereotypes) About Being Forceful or Persistent

Males were stereotyped as being more forceful than females in the two available studies (Table 12.1.1.49).

Table 12.1.1.49. Beliefs (stereotypes) about being forceful or persistent.

Nature of Any Difference					Postpubertal	
						Adult
Males perceived as more						**EUROPE** *Norway***:** JE Williams & Best 1977 (college, persistent) **NORTH AMERICA** *United States*: Werner & LaRussa 1985 (college, forceful)
No signif. difference						
Females perceived as more						

12.1.1.50. Beliefs (Stereotypes) About Football Participation

One study of beliefs about sex differences in football participation concluded that males were thought to be more involved than females (Table 12.1.1.50).

Table 12.1.1.50. Beliefs (stereotypes) about football participation.

Nature of Any Difference					Postpubertal	
					Adolescent	
Males perceived as more					**NORTH AMERICA** *United States*: BA Riemer & Visio 2003:200	
No signif. difference						
Females perceived as more						

12.1.1.51. Beliefs (Stereotypes) About Being Frank

Males were stereotyped as being more frank than females in the one available study (Table 12.1.1.51).

Table 12.1.1.51. Beliefs (stereotypes) about being frank.

Nature of Any Difference					Postpubertal	
						Adult
Males perceived as more						**NORTH AMERICA** *United States*: Werner & LaRussa 1985 (college)
No signif. difference						
Females perceived as more						

12.1.1.52. Beliefs (Stereotypes) About Friendliness/Helpfulness

Based on responses to questionnaires, most studies have found women to be perceived as friendlier on average than men by members of both sexes (Table 12.1.1.52).

Table 12.1.1.52. Beliefs (stereotypes) about friendliness/helpfulness.

Nature of Any Difference	Prepubertal				Postpubertal	
				Childhood		Adult
Males thought to be more						**OCEANIA** *Sri Lanka*: de Munck 2002:242*
No signif. difference						
Females thought to be more				**NORTH AMERICA** *United States*: Cowan & Hoffman 1986 (more talkative, likely to ask adults for help)		**NORTH AMERICA** *United States*: Werner & LaRussa 1985 (college); RB Hays & Oxley 1986; Burda & Vaux 1987; Feingold 1998:263; de Munck et al. 2002: 242*

12.1.1.53. Beliefs (Stereotypes) About Being Frivolous

Females were stereotyped as being more frivolous than males according to the one available study (Table 12.1.1.53).

Table 12.1.1.53. Beliefs (stereotypes) about being frivolous.

Nature of Any Difference	Postpubertal
	Adult
Males perceived as more	
No signif. difference	
Females perceived as more	**NORTH AMERICA** *United States*: Werner & LaRussa 1985 (college)

12.1.1.54. Beliefs (Stereotypes) About Being Fussy

The sex that was thought to be fussier than the other was females, according to the one available study (Table 12.1.1.54).

Table 12.1.1.54. Beliefs (stereotypes) about being fussy.

Nature of Any Difference	Postpubertal
	Adult
Males perceived as more	
No signif. difference	
Females perceived as more	**NORTH AMERICA** *United States*: Werner & LaRussa 1985 (college)

12.1.1.55. Beliefs (Stereotypes) About Being Gentle

The sex that has been shown to be stereotyped as gentler, according to two studies, was females rather than males (Table 12.1.1.55).

Table 12.1.1.55. Beliefs (stereotypes) about being gentle.

Nature of Any Difference	Postpubertal
	Adult
Males thought to be more	
No signif. difference	
Females thought to be more	**EUROPE** *Netherlands*: Visser 1996:593 (college) **NORTH AMERICA** *United States*: Werner & LaRussa 1985 (college)

12.1.1.56. Beliefs (Stereotypes) About Gossiping

A limited amount of research has been undertaken to determine which sex is thought to gossip more. This research has concluded that in two countries females are thought to gossip more than males (Table 12.1.1.56).

Table 12.1.1.56. Beliefs (stereotypes) about gossiping.

Nature of Any Difference	Postpubertal
	Adult
Males thought to more	
No signif. difference	
Females thought to more	**NORTH AMERICA** *United States*: Rysman 1977; Poveda 1975; de Munck et al. 2002:246* **OCEANIA** *Sri Lanka*: de Munck et al. 2002:246*

12.1.1.57. Beliefs (Stereotypes) About Being Graceful

Two studies concluded that females were believed to be more graceful than males (Table 12.1.1.57).

Table 12.1.1.57. Beliefs (stereotypes) about being graceful.

Nature of Any Difference	Postpubertal
	Adolescent
Males perceived as more	
No signif. difference	
Females perceived as more	**EUROPE** *Norway*: JE Williams & Best 1977

12.1.1.58. Beliefs (Stereotypes) About Being Greedy

No sex difference was found in the one study of stereotypes surrounding the tendency to be greedy (Table 12.1.1.58).

Table 12.1.1.58. Beliefs (stereotypes) about being greedy.

Nature of Any Difference	Postpubertal
	Adult
Males perceived as more	
No signif. difference	**NORTH AMERICA** *United States*: Werner & LaRussa 1985 (college)
Females perceived as more	

12.1.1.59. Beliefs (Stereotypes) About Gymnastics and Aerobics Participation

According to one study, females were thought to be more often involved in gymnastics and aerobics than men (Table 12.1.1.59).

Table 12.1.1.59. Beliefs (stereotypes) about gymnastics and aerobics participation.

Nature of Any Difference	Postpubertal
Males perceived as more	
No signif. difference	
Females perceived as more	**NORTH AMERICA** *United States*: BA Riemer & Visio 2003:200

12.1.1.60. Beliefs (Stereotypes) About Being Hasty

As shown in Table 12.1.1.60, one study suggested that being hasty was more characteristic of males than of females.

Table 12.1.1.60. Beliefs (stereotypes) about being hasty.

Nature of Any Difference	Postpubertal
	Adult
Males perceived as more	**NORTH AMERICA** *United States*: Werner & LaRussa 1985 (college)
No signif. difference	
Females perceived as more	

12.1.1.61. Beliefs (Stereotypes) About Being Hierarchically Oriented

According to two studies, males are perceived as being more inclined to organize themselves into hierarchies than is the case for females (who are thought to be more egalitarian in their organizational styles and interpersonal relationships) (Table 12.1.1.61).

Table 12.1.1.61. Beliefs (stereotypes) about being hierarchically oriented.

Nature of Any Difference	Postpubertal
	Adult
Males perceived as more	**NORTH AMERICA** *United States*: Rudman et al. 2001; Schmid Mast 2004 (college)
No signif. difference	
Females perceived as more	

12.1.1.62. Beliefs (Stereotypes) About Participating in Hockey

One study concluded that males were thought to participate in hockey more than females (Table 12.1.1.62).

Table 12.1.1.62. Beliefs (stereotypes) about participating in hockey.

Nature of Any Difference					
					Adolescent
Males perceived as more					**NORTH AMERICA** *United States*: BA Riemer & Visio 2003:200
No signif. difference					
Females perceived as more					

12.1.1.63. Beliefs (Stereotypes) About Being Hostile

Males are perceived as being more hostile than females according to the findings from one study (Table 12.1.1.63).

Table 12.1.1.63. Beliefs (stereotypes) about being hostile.

Nature of Any Difference					Postpubertal	
						Adult
Males perceived as more						**NORTH AMERICA** *United States*: Werner & LaRussa 1985 (college)
No signif. difference						
Females perceived as more						

12.1.1.64. Beliefs (Stereotypes) About Being Humorous/Witty

Somewhat inconsistent conclusions have been reached concerning any stereotyped sex differences in being humorous or witty (Table 12.1.1.64).

Table 12.1.1.64. Beliefs (stereotypes) about being humorous/witty.

Nature of Any Difference					Postpubertal	
						Adult
Males thought to be more						**NORTH AMERICA** *United States*: Sherriffs & McKee 1957:453 (college)
No signif. difference						**NORTH AMERICA** *United States*: Werner & LaRussa 1985 (college)
Females thought to be more						

12.1.1.65. Beliefs (Stereotypes) About Being Ill (or Frequently Ill)

Studies have reached inconsistent conclusions regarding people's stereotypes surrounding which sex is most likely to be ill or most frequently ill (Table 12.1.1.65).

Table 12.1.1.65. Beliefs (stereotypes) about being ill (or frequently ill).

Nature of Any Difference					Postpubertal	
						Adult
Males perceived as more						**NORTH AMERICA** *United States*: Sherriffs & McKee 1957:453 (by college students)
No signif. difference						
Females perceived as more						**EUROPE** *Britain*: S Macintyre et al. 1999 (by physicians)

12.1.1.66. Beliefs (Stereotypes) About Being Imaginative

According to one study, females were believed to be more imaginative than males (Table 12.1.1.66).

Table 12.1.1.66. Beliefs (stereotypes) about being imaginative.

Nature of Any Difference					Postpubertal	
						Adult
Males perceived as more						
No signif. difference						
Females perceived as more						**NORTH AMERICA** *United States*: Werner & LaRussa 1985 (college)

12.1.1.67. Beliefs (Stereotypes) About Being Independent

Several studies have asked subjects of various ages which sex they believe is most likely to be independent, usually leaving it up to the subjects to answer in terms of their own conceptions of the term *independence*. As shown in Table 12.1.1.67, all of these studies have concluded that males are thought to be more independent than females.

Table 12.1.1.67. Believe (stereotypes) about being independent.

Nature of Any Difference	Prepubertal	Postpubertal	
	Childhood	Adolescent	Adult
Males thought to be more	**NORTH AMERICA** *United States*: Ruble & Martin 1998	**NORTH AMERICA** *United States*: JP Hill & Lynch 1983; Huston & Alvarez 1990; Neff & Terry-Schmitt 2002*	**EUROPE** *Netherlands*: Visser 1996:593 (college) **NORTH AMERICA** *United States*: Sherriffs & McKee 1957:453 (college); VW Berninger & DeSoto 1985; Werner & LaRussa 1985 (college); Heilman et al. 1995 (by company managers); Neff & Terry-Schmitt 2002* (college) **INTERNATIONAL** *Multiple Countries*: JE Williams & Best 1982 (30/30 countries)
No signif. difference			
Females thought to be more			

12.1.1.68. Beliefs (Stereotypes) About Being Industrious

Males more often than females were stereotyped as being industrious according to the one available study (Table 12.1.1.68).

Table 12.1.1.68. Beliefs (stereotypes) about being industrious.

Nature of Any Difference	Postpubertal
	Adult
Males perceived as more	**NORTH AMERICA** *United States*: Werner & LaRussa 1985 (college)
No signif. difference	
Females perceived as more	

12.1.1.69. Beliefs (Stereotypes) About Being Intelligent

Two studies found males being more often stereotyped as intelligent when compared to females, but one other study failed to find a significant gender difference in this regard (Table 12.1.1.69).

Table 12.1.1.69. Believe (stereotypes) about being intelligent.

Nature of Any Difference	Postpubertal
	Adult
Males thought to be more	**LATIN AMERICA** *Argentina*: Furnham & Chamorro-Premuzic 2005 (college, both sexes rating their fathers) **NORTH AMERICA** *United States*: Canetto et al. 1995 (elderly)
No signif. difference	**NORTH AMERICA** *United States*: Werner & LaRussa 1985 (college)
Females thought to be more	

12.1.1.70. Beliefs (Stereotypes) About Being Interested in Art

One study found that females were perceived as being more interested in art than were males (Table 12.1.1.70).

Table 12.1.1.70. Beliefs (stereotypes) about being interested in art.

Nature of Any Difference	Postpubertal
	Adult
Males thought to be more	
No significant difference	
Females thought to be more	**NORTH AMERICA** *United States*: Nosek et al. 2002

12.1.1.71. Beliefs (Stereotypes) About Interest in Science and Engineering

Table 12.1.1.71 shows that one study concluded that more males were thought to major in science and engineering than was the case for females.

Table 12.1.1.71. Beliefs (stereotypes) about interest in science and engineering.

Nature of Any Difference	Postpubertal	
		Adult
Males thought to be more		**NORTH AMERICA** *United States*: McCauley 1995:237 (college)
No signif. difference		
Females thought to be more		

12.1.1.72. Beliefs (Stereotypes) About Being Interested in Sports

According to one study, males were thought to have a greater interest in watching sports than were females (Table 12.1.1.72).

Table 12.1.1.72. Beliefs (stereotypes) about being interested in sports.

Nature of Any Difference	Postpubertal	
		Adult
Males thought to be more		**NORTH AMERICA** *United States*: McCauley 1995:236 (television, college)
No signif. difference		
Females thought to be more		

12.1.1.73. Beliefs (Stereotypes) About Life Expectancy

In one study conducted in two countries, females were believed to live longer on average than males (Table 12.1.1.73).

Table 12.1.1.73. Beliefs (stereotypes) about life expectancy.

Nature of Any Difference					Postpubertal	
						Adult
Males thought to live longer						
No signif. difference						
Females thought to live longer						**NORTH AMERICA** *United States*: de Munck et al. 2002:246* **OCEANIA** *Sri Lanka*: de Munck et al. 2002:246*

12.1.1.74. Beliefs (Stereotypes) About Being Logical

One study concluded that greater proportions of people thought males were more logical than was the case for females (Table 12.1.1.74).

Table 12.1.1.74. Beliefs (stereotypes) about being logical.

Nature of Any Difference					Postpubertal	
						Adult
Males thought to be more						**NORTH AMERICA** *United States*: Sherriffs & McKee 1957:453 (college); P Johnson 1978; Werner & LaRussa 1985 (college)
No signif. difference						
Females thought to be more						

12.1.1.75. Beliefs (Stereotypes) About Being Lovable

Females were more often than males to be stereotyped as being lovable according to the one available study (Table 12.1.1.75).

Table 12.1.1.75. Beliefs (stereotypes) about being lovable.

Nature of Any Difference						Postpubertal
						Adult
Males perceived as more						
No signif. difference						
Females perceived as more						**NORTH AMERICA** *United States*: Werner & LaRussa 1985 (college)

12.1.1.76. Beliefs (Stereotypes) About Loving Children

People in two countries were asked whether males or females loved children more. In both countries, females were perceived (stereotyped) as doing so to a greater degree than males (Table 12.1.1.76).

Table 12.1.1.76. Beliefs (stereotypes) about loving children.

Nature of Any Difference						Postpubertal
						Adult
Males thought to more						
No signif. difference						
Females thought to more						**NORTH AMERICA** *United States*: de Munck et al. 2002:238* **OCEANIA** *Sri Lanka*: de Munck et al. 2002:238*

12.1.1.77. Beliefs (Stereotypes) About Being Masculine

The one available study on stereotypes surrounding masculinity concluded that males were thought to be more so than females (Table 12.1.1.77).

Table 12.1.1.77. Beliefs (stereotypes) about being masculine.

Nature of Any Difference						Postpubertal
						Adult
Males perceived as more						**NORTH AMERICA** *United States*: Werner & LaRussa 1985 (college)
No signif. difference						
Females perceived as more						

12.1.1.78. Beliefs (Stereotypes) About Math Abilities

As shown in Table 12.1.1.78, all studies of stereotypes surrounding math ability have concluded that mare are thought to be more capable and more interested than females.

Table 12.1.1.78. Beliefs (stereotypes) about math abilities.

Nature of Any Difference					Postpubertal	
					Adolescent	Adult
Males thought to be better					**ASIA** *Japan*: Tartre & Fennnema 1995 (better at math) **EUROPE** *Switzerland*: C Keller 2001 (better at math) **OCEANIA** *Australia*: Iben 1991 (better at math)	**NORTH AMERICA** *United States*: JS Hyde et al. 1990 (better at math); Nosek et al. 2002 (males stereotyped as more interested)
No signif. difference						
Females thought to be better						

12.1.1.79. Beliefs (Stereotypes) About Being Moody

Mixed results have been obtained regarding any stereotyped sex difference in moodiness (Table 12.1.1.79).

Table 12.1.1.79. Beliefs (stereotypes) about being moody.

Nature of Any Difference						Postpubertal
						Adult
Males perceived as more						
No signif. difference						**NORTH AMERICA** *United States*: Werner & LaRussa 1985 (college)
Females perceived as more						**EUROPE** *Norway*: JE Williams & Best 1977 (college moody/gloomy)

12.1.1.80. Beliefs (Stereotypes) About Being Neurotic

Which sex is more likely to be neurotic? The one available study found most people identifying this trait more with females than with males (Table 12.1.1.80).

Table 12.1.1.80. Beliefs (stereotypes) about being neurotic.

Nature of Any Difference	Postpubertal
	Adult
Males perceive as more	
No signif. difference	
Females perceive as more	**NORTH AMERICA** *United States*: Werner & LaRussa 1985 (college)

12.1.1.81. Beliefs (Stereotypes) About Being Nurturing

A few studies have asked citizens of the United States if they thought males or females were more likely to be nurturing toward others. In all cases, females were perceived to be more so than males (Table 12.1.1.81).

Table 12.1.1.81. Beliefs (stereotypes) about being nurturing.

Nature of Any Difference	Prepubertal	Postpubertal
	Early Childhood	Adult
Males thought to be more		
No signif. difference		
Females thought to be more	**NORTH AMERICA** *United States*: Birnbaum et al. 1980	**NORTH AMERICA** *United States*: Bem et al. 1976 (college); Eagly & Steffen 1984; M Coleman & Ganong 1985; Fabes & Martin 1991; Karbon et al. 1992; Canetto et al. 1995 (elderly); Ray & Gold 1996 (college)

12.1.1.82. Beliefs (Stereotypes) About Obedience

According to Table 12.1.1.82, females are thought to be more obedient to a greater degree than males are believed to be.

Table 12.1.1.82. Beliefs (stereotypes) about obedience.

Nature of Any Difference	Prepubertal	Postpubertal	
	Childhood	Adolescence	Adult
Males thought to be more			
No signif. difference			
Females thought to be more	**EUROPE** *Britain*: S Jones & Myhill 2004* (interviews)	**EUROPE** *Britain*: S Jones & Myhill 2004* (interviews)	**EUROPE** *Britain*: S Jones & Myhill 2004* (interviews)

12.1.1.83. Beliefs (Stereotypes) About Being Obnoxious

One study concluded that males were stereotyped as being more obnoxious than females (Table 12.1.1.83).

Table 12.1.1.83. Beliefs (stereotypes) about being obnoxious.

Nature of Any Difference	Postpubertal
	Adult
Males perceived as more	**NORTH AMERICA** *United States*: Werner & LaRussa 1985 (college)
No significant difference	
Females perceived as more	

12.1.1.84. Beliefs (Stereotypes) About Occupational Hierarchy Positions

Several studies have concluded that males are more likely than females to be perceived as occupying relatively high occupational positions, or as performing better in those positions (Table 12.1.1.84).

Table 12.1.1.84. Beliefs (stereotypes) about occupational hierarchy positions.

Nature of Any Difference					Postpubertal		
						Adult	
Male perceived as more						**NORTH AMERICA** *United States*: Schein 1973 (manager); OC Brenner et al. 1989 (better managers); Schein et al. 1989 (managers); ME Heilman et al. 1995 (better managers); Powell et al. 2002 (managers); Willemsen 2002 (managers); Sczesny 2003 (managers)	
No significant difference							
Female perceived as more							

12.1.1.85. Beliefs (Stereotypes) About Occupational Preferences and Choices

In one study, subjects were asked which sex was most likely to choose a few specific types of occupations. As shown in Table 12.1.1.85, this study concluded that males were thought to be more likely to choose occupations such as being a city planner or lawyer, while females were believed to have greater interests in dietetics and in being a primary school teacher.

Table 12.1.1.85. Beliefs (stereotypes) about occupational preferences and choices.

Nature of Any Difference					Postpubertal		
					Adolescent	Adult	
Male perceived as more likely to do so					**NORTH AMERICA** *United States*: Mischel 1974* (city planning & law)	**MIDDLE EAST** *Israel*: Mischel 1974* (city planning & law) **NORTH AMERICA** *United States*: Mischel 1974* (city planning & law)	
No signif. difference							
Female perceived as more likely to do so					**NORTH AMERICA** *United States*: Mischel 1974* (dietetics & primary education teacher)	**NORTH AMERICA** *United States*: Mischel 1974* (dietetics & primary education) **MIDDLE EAST** *Israel*: Mischel 1974* (dietetics & primary education teacher)	

12.1.1.86. Beliefs (Stereotypes) About Being Opinionated

One study concluded that males were believed to be more strongly opinionated than were females (Table 12.1.1.86).

Table 12.1.1.86. Beliefs (stereotypes) about being opinionated.

Nature of Any Difference					Postpubertal		
						Adult	
Males thought to be more						**NORTH AMERICA** *United States*: Sherriffs & McKee 1957:453 (college); Werner & LaRussa 1985 (college)	
No signif. difference							
Females thought to be more							

12.1.1.87. Beliefs (Stereotypes) About Being Optimistic

According to one study, females were stereotyped as generally being more optimistic to a greater extent than were males (Table 12.1.1.87).

Table 12.1.1.87. Beliefs (stereotypes) about being optimistic.

Nature of Any Difference					Postpubertal		
						Adult	
Males perceived as more							
No signif. difference							
Females perceived as more						**NORTH AMERICA** *United States*: Werner & LaRussa 1985 (college)	

12.1.1.88. Beliefs (Stereotypes) About Pain Tolerance

Several studies have sought to determine which sex is thought to be more prone to tolerate pain. Most have concluded that females are believed to tolerate more pain than males (Table 12.1.1.88).

Table 12.1.1.88. Beliefs (stereotypes) about pain tolerance.

Nature of Any Difference	Postpubertal	Multiple Age Categories
	Adult	
Males believed to tolerate more	**NORTH AMERICA** *Canada*: Rollman 1983 (men's beliefs)	
No signif. difference		
Females believed to tolerate more		**EUROPE** *Britain*: Nurofen 1989 (opinions of both males & females); Bendelow 1993:286 (opinions of both males & females); Bendelow 1993 (women especially thought so); Bendelow 2000 (both sexes thought so) **NORTH AMERICA** *United States*: Fillingim & Maixner 1996 (thermal pain)

12.1.1.89. Beliefs (Stereotypes) About Being Patient

One study provided evidence that females were believed to be more patient than males (Table 12.1.1.89).

Table 12.1.1.89. Beliefs (stereotypes) about being patient.

Nature of Any Difference	Postpubertal
	Adult
Males perceived as more	
No signif. difference	
Females perceived as more	**NORTH AMERICA** *United States*: Werner & LaRussa 1985 (college)

12.1.1.90. Beliefs (Stereotypes) About Physical Height

According to limited research among college students, males were believed to be taller, but among preschoolers, adult men and women were not perceived as being significantly different in height (Table 12.1.1.90).

Table 12.1.1.90. Beliefs (stereotypes) about physical height.

Nature of Any Difference	Prepubertal	Postpubertal
	Early Childhood	Adult
Males thought to be taller		**NORTH AMERICA** *United States*: T Nelson et al. 1990 (college)
No signif. difference	**NORTH AMERICA** *United States*: Biernat 1993 (preschool)	
Females thought to be taller		

12.1.1.91. Beliefs (Stereotypes) About Physical Strength

The two studies that asked subjects which gender was physically stronger concluded that males were thought to be so to a greater degree than females (Table 12.1.1.91).

Table 12.1.1.91. Beliefs (stereotypes) about physical strength.

Nature of Any Difference	Postpubertal
	Adult
Males thought to be stronger	**EUROPE** *Netherlands*: Visser 1996:593 (college) **NORTH AMERICA** *United States*: Cowan & Hoffman 1986
No signif. difference	
Females thought to be stronger	

12.1.1.92. Beliefs (Stereotypes) About Being Poised

Which sex exhibits greater poise? According to two studies, females are thought by both sexes to be so more than males while a third study concluded the opposite with respect to being "dignified" (Table 12.1.1.92).

Table 12.1.1.92. Beliefs (stereotypes) about being poised.

Nature of Any Difference					Postpubertal	
						Adult
Males thought to be more						**EUROPE** *Norway*: JE Williams & Best 1977 (college, "dignified")
No signif. difference						
Females thought to be more						**NORTH AMERICA** *United States*: Sherriffs & McKee 1957:453 (college); Werner & LaRussa 1985 (college)

12.1.1.93. Beliefs (Stereotypes) About Being Polite/Well-Mannered/Considerate

As shown in Table 12.1.1.93, one study found women to be stereotyped as being more polite and well-mannered than is the case for males.

Table 12.1.1.93. Beliefs (stereotypes) about being polite/well-mannered/considerate.

Nature of Any Difference					Postpubertal	
						Adult
Males perceived as more						
No signif. difference						
Females perceived as more						**NORTH AMERICA** *United States*: Werner & LaRussa 1985 (college)

12.1.1.94. Beliefs (Stereotypes) About Political Attitudes

All available studies have concluded that females are stereotyped as being more politically liberal than is the case for males (Table 12.1.1.94).

Table 12.1.1.94. Beliefs (stereotypes) about political attitudes.

Nature of Any Difference					Postpubertal	
						Adult
Males perceived as more liberal						
No signif. difference						
Females perceived as more liberal						**NORTH AMERICA** *United States*: V Sapiro 1981; D Alexander & Andersen 1993; Huddy & Terkildsen 1993a; Huddy & Terkildsen 1993b; Burrell 1994

12.1.1.95. Beliefs (Stereotypes) About Being Prejudiced

The one available study of sex differences in people's tendencies to be prejudiced concluded that there was no significant sex difference (Table 12.1.1.95).

Table 12.1.1.95. Beliefs (stereotypes) about being prejudiced.

Nature of Any Difference					Postpubertal	
						Adult
Males perceived as more						
No signif. difference						**NORTH AMERICA** *United States*: Werner & LaRussa 1985 (college)
Females perceived as more						

12.1.1.96. Beliefs (Stereotypes) About Being Quiet/Meek

A study of stereotyped sex differences in being quiet and meek concluded that females were thought to be more so than males (Table 12.1.1.96).

Table 12.1.1.96. Beliefs (stereotypes) about being quiet/meek.

Nature of Any Difference					Postpubertal	
						Adult
Males perceived as more						
No signif. difference						
Females perceived as more						**NORTH AMERICA** *United States*: Werner & LaRussa 1985 (college)

12.1.1.97. Beliefs (Stereotypes) About Tendencies to Read

According to the one study located, females were stereotyped as reading more than males (Table 12.1.1.97).

Table 12.1.1.97. Beliefs (stereotypes) about tendencies to read.

Nature of Any Difference	Prepubertal
	Early Childhood
Males perceived as more	
No signif. difference	
Females perceived as more	**NORTH AMERICA** *United States*: Kagan 1964

12.1.1.98. Beliefs (Stereotypes) About Being Realistic

A study of stereotyped sex differences in being realistic concluded that males and females were believed to be virtually equivalent in this regard (Table 12.1.1.98).

Table 12.1.1.98. Beliefs (stereotypes) about being realistic.

Nature of Any Difference	Postpubertal
	Adult
Males perceived as more	
No signif. difference	**NORTH AMERICA** *United States*: Werner & LaRussa 1985 (college)
Females perceived as more	

12.1.1.99. Beliefs (Stereotypes) About Being Religious

Two studies found females being thought of as being more strongly religious than males (Table 12.1.1.99).

Table 12.1.1.99. Beliefs (stereotypes) about being religious.

Nature of Any Difference	Postpubertal
	Adult
Males thought to be more	
No signif. difference	
Females thought to be more	**NORTH AMERICA** *United States*: Sherriffs & McKee 1957:453 (college); Werner & LaRussa 1985 (college)

12.1.1.100. Beliefs (Stereotypes) About Being Rude

According to the one available study, males were stereotyped as generally being more rude than females (Table 12.1.1.100)

Table 12.1.1.100. Beliefs (stereotypes) about being rude.

Nature of Any Difference	Postpubertal
	Adult
Males perceived as more	**NORTH AMERICA** *United States*: Werner & LaRussa 1985 (college)
No signif. difference	
Females perceived as more	

12.1.1.101. Beliefs (Stereotypes) About Being Rugged

Table 12.1.1.101 shows that two studies concluded that males are perceived as being more rugged than is the case for females.

Table 12.1.1.101. Beliefs (stereotypes) about being rugged.

Nature of Any Difference	Postpubertal
	Adult
Males thought to be more	**NORTH AMERICA** *United States*: Sherriffs & McKee 1957:453 (college); Werner & LaRussa 1985 (college)
No signif. difference	
Females thought to be more	

12.1.1.102. Beliefs (Stereotypes) About Being Sarcastic

Research findings have reached different conclusions with respect to any stereotyped gender difference in sarcasm (Table 12.1.1.102).

Table 12.1.1.102. Beliefs (stereotypes) about being sarcastic.

Nature of Any Difference						Postpubertal
						Adult
Males perceived as more						**EUROPE** *Norway*: JE Williams & Best 1977 (college)
No signif. difference						**NORTH AMERICA** *United States*: Werner & LaRussa 1985 (college)
Females perceived as more						

12.1.1.103. Beliefs (Stereotypes) About Being Self-Centered

Table 12.1.1.103 shows that two studies concluded that males were more often stereotyped as being self-centered than were females.

Table 12.1.1.103. Beliefs (stereotypes) about being self-centered.

Nature of Any Difference						Postpubertal
						Adult
Males perceived as more						**EUROPE** *Norway*: JE Williams & Best 1977 (college, demanding) **NORTH AMERICA** *United States*: Werner & LaRussa 1985 (college)
No signif. difference						
Females perceived as more						

12.1.1.104. Beliefs (Stereotypes) About Being Self-Confident

Two studies concluded that males were thought to be more self-confident than was the case for females (Table 12.1.1.104).

Table 12.1.1.104. Beliefs (stereotypes) about being self-confident.

Nature of Any Difference						Postpubertal
						Adult
Males thought to be more						**NORTH AMERICA** *United States*: Sherriffs & McKee 1957:453 (college); Werner & LaRussa 1985 (college)
No signif. difference						
Females thought to be more						

12.1.1.105. Beliefs (Stereotypes) About Having Self-Pity

According to a study of stereotypes, females were thought to be more prone toward self-pity than were males (Table 12.1.1.105).

Table 12.1.1.105. Beliefs (stereotypes) about having self-pity.

Nature of Any Difference						Postpubertal
						Adult
Males perceived as more						
No signif. difference						
Females perceived as more						**NORTH AMERICA** *United States*: Werner & LaRussa 1985 (college)

12.1.1.106. Beliefs (Stereotypes) About Being Selfish

Responses to questionnaires designed to measure stereotypes have reached inconsistent conclusions regarding any gender differences in tendencies toward being selfish (Table 12.1.1.106).

Table 12.1.1.106. Beliefs (stereotypes) about being selfish.

Nature of Any Difference					Postpubertal		
						Adult	
Males thought to be more						**NORTH AMERICA** *United States*: Feingold 1998:263; Boldy et al. 2001 (sample: military trainees of both sexes)	
No signif. difference						**NORTH AMERICA** *United States*: Werner & LaRussa 1985 (college)	
Females thought to be more						**EUROPE** *Norway*: JE Williams & Best 1977 (college)	

12.1.1.107. Beliefs (Stereotypes) About Being Sensitive

One study concluded that females were stereotyped as being more sensitive than males (Table 12.1.1.107).

Table 12.1.1.107. Beliefs (stereotypes) about being sensitive.

Nature of Any Difference					Postpubertal		
						Adult	
Males perceived as more							
No signif. difference							
Females perceived as more						**NORTH AMERICA** *United States*: Werner & LaRussa 1985 (college)	

12.1.1.108. Beliefs (Stereotypes) About Being Sentimental

A study pertaining to sentimentality found subjects believing that females were more sentimental than males (Table 12.1.1.108).

Table 12.1.1.108. Beliefs (stereotypes) about being sentimental.

Nature of Any Difference					Postpubertal		
						Adult	
Males perceived as more							
No signif. difference							
Females perceived as more						**NORTH AMERICA** *United States*: Werner & LaRussa 1985 (college)	

12.1.1.109. Beliefs (Stereotypes) About Being Homosexual

According to one study, greater proportions of people believe that homosexuality is more prevalent among males than among females (Table 12.1.1.109).

Table 12.1.1.109. Beliefs (stereotypes) about being homosexuality.

Nature of Any Difference					Postpubertal		
						Adult	
Males believed to be more						**NORTH AMERICA** *United States*: FY Wong et al. 1999	
No signif. difference							
Females believed to be more							

12.1.1.110. Beliefs (Stereotypes) About Sexual Promiscuity or Spousal Cheating

Adult subjects have been asked whether males or females seek to be sexually promiscuous or to have sexual intercourse with persons other than their spouses. In the United States, subjects answered that males were more inclined to do so, whereas in Sri Lanka, subjects thought the sexes were equally likely to seek opportunities to cheat on one's spouse (Table 12.1.1.110).

Table 12.1.1.110. Beliefs (stereotypes) about sexual promiscuity or spousal cheating.

Nature of Any Difference					Postpubertal		
						Adult	
Males thought to be more motivated to do so						**NORTH AMERICA** *United States*: LL Cohen & Shotland 1996 (promiscuity); de Munck et al. 2002:241* (cheating on spouse)	
No signif. difference						**OCEANIA** *Sri Lanka*: de Munck et al. 2002:241* (cheating on spouse)	
Females thought to be more motivated to do so							

12.1.1.111. Beliefs (Stereotypes) About Being Sexy

The one available study concluded that there is no significant sex difference regarding the attribute of sexiness (Table 12.1.1.111).

Table 12.1.1.111. Beliefs (stereotypes) about being sexy.

Nature of Any Difference					Postpubertal	
						Adult
Males perceived as more						
No signif. difference						**NORTH AMERICA** *United States*: Werner & LaRussa 1985 (college)
Females perceived as more						

12.1.1.112. Beliefs (Stereotypes) About Being Shy/Timid

One study concluded that females were thought to be more shy and timid than was the case for males (Table 12.1.1.112)

Table 12.1.1.112. Beliefs (stereotypes) about being shy/timid.

Nature of Any Difference					Postpubertal	
						Adult
Males perceived as more						
No signif. difference						
Females perceived as more						**NORTH AMERICA** *United States*: Werner & LaRussa 1985 (college)

12.1.1.113. Beliefs (Stereotypes) About Being Sincere

A stereotype study of sincerity concluded that males and females were not thought to differ to a significant degree regarding this trait (Table 12.1.1.113).

Table 12.1.1.113. Beliefs (stereotypes) about being sincere.

Nature of Any Difference					Postpubertal	
						Adult
Males perceived as more						
No signif. difference						**NORTH AMERICA** *United States*: Werner & LaRussa 1985 (college)
Females perceived as more						

12.1.1.114. Beliefs (Stereotypes) About Smiling

Surveys of people's stereotypes regarding sex differences in smiling have indicated that both males and females believed that females were more prone to smile than were males (Table 12.1.1.114).

Table 12.1.1.114. Beliefs (stereotypes) about smiling.

Nature of Any Difference					Postpubertal		Multiple Age Categories
						Adult	
Males thought to do so more							
No signif. difference							
Females thought to do so more						**NORTH AMERICA** *Canada*: Fischer 1993 (college); *United States*: JT Johnson & Shulman 1988; Briton & Hall 1995a (college)	**NORTH AMERICA** *United States*: C Kramer 1977; DG Freedman 1979:176

12.1.1.115. Beliefs (Stereotypes) About Being Snobbish

No significant sex difference was found regarding the degree to which people were stereotyped as being snobbish (Table 12.1.1.115).

Table 12.1.1.115. Beliefs (stereotypes) about being snobbish.

Nature of Any Difference	Postpubertal
	Adult
Males perceived as more	
No signif. difference	**NORTH AMERICA** *United States*: Werner & LaRussa 1985 (college)
Females perceived as more	

12.1.1.116. Beliefs (Stereotypes) About Being Sociable

According to two studies, females were thought to be more sociable than males while a third study failed to report a significant difference in this regard (Table 12.1.1.116).

Table 12.1.1.116. Beliefs (stereotypes) about being sociable.

Nature of Any Difference	Postpubertal
	Adult
Males thought to be more	
No signif. difference	**NORTH AMERICA** *United States*: Werner & LaRussa 1985 (college)
Females thought to be more	**EUROPE** *Norway***:** JE Williams & Best 1977 (college) **NORTH AMERICA** *United States*: Sherriffs & McKee 1957:453 (college)

12.1.1.117. Beliefs (Stereotypes) About Social Intelligence

Social intelligence basically has to do with the extent to which one is able to get along with others and to express oneself clearly in the company of others. Studies have found that females are perceived as having a higher social intelligence than are males (Table 12.1.1.117).

Table 12.1.1.117. Beliefs (stereotypes) about social intelligence.

Nature of Any Difference	Prepubertal	Postpubertal	
	Childhood	Adolescents	Adult
Males thought to be more			
No significant difference			
Females thought to be more	**EUROPE** *Finland*: Raty et al. 1999 (parents rating children)	**EUROPE** *Finland*: Raty & Snellman 1992* (rated adolescents)	**ASIA** *Japan*: Azuma & Kashiwagi 1987 (rate other adults) **EUROPE** *Finland*: Raty & Snellman 1992* (rated other adults)

12.1.1.118. Beliefs (Stereotypes) About Being Soft-Hearted

Females are stereotyped as being more soft-hearted than is the case for males, according to the one available study (Table 12.1.1.118).

Table 12.1.1.118. Beliefs (stereotypes) about being soft-hearted.

Nature of Any Difference	Postpubertal
	Adult
Males thought to be more	
No signif. difference	
Females thought to be more	**NORTH AMERICA** *United States*: Werner & LaRussa 1985 (college)

12.1.1.119. Beliefs (Stereotypes) About Being Sophisticated

One study found females as being thought to be more sophisticated than males (Table 12.1.1.119).

Table 12.1.1.119. Beliefs (stereotypes) about being sophisticated.

Nature of Any Difference	Postpubertal
	Adult
Males thought to be more	
No signif. difference	
Females thought to be more	**NORTH AMERICA** *United States*: Werner & LaRussa 1985 (college)

12.1.1.120. Beliefs (Stereotypes) About Being Spontaneous

In one study, females were stereotyped as being more spontaneous than were males (Table 12.1.1.120).

Table 12.1.1.120. Beliefs (stereotypes) about being spontaneous.

Nature of Any Difference					Postpubertal	
						Adult
Males thought to be more						
No signif. difference						
Females thought to be more						**NORTH AMERICA** *United States*: Werner & LaRussa 1985 (college)

12.1.1.121. Beliefs (Stereotypes) About Strength of the Sex Drive

Beliefs about the strength of men's and women's sex drive appear to vary by culture according to a limited amount of research. A study among citizens of the United States found most people asserting that males have a stronger sex drive, whereas the same study in Sri Lanka concluded that females do (Table 12.1.1.121).

Table 12.1.1.121. Beliefs (stereotypes) about strength of the sex drive.

Nature of Any Difference					Postpubertal	
						Adult
Males thought to be stronger						**NORTH AMERICA** *United States*: de Munck et al. 2002:242*
No signif. difference						
Females thought to be stronger						**OCEANIA** *Sri Lanka*: de Munck et al. 2002:242*

12.1.1.122. Beliefs (Stereotypes) About Being Stingy

The available research on stereotypes concerning sex differences in stinginess have indicated that females are thought to be so or that no sex difference in stinginess exists (Table 12.1.1.122).

Table 12.1.1.122. Beliefs (stereotypes) about being stingy.

Nature of Any Difference					Postpubertal	
						Adult
Males thought to be more						
No signif. difference						**NORTH AMERICA** *United States*: Werner & LaRussa 1985 (college)
Females thought to be more						**EUROPE** *Norway*: JE Williams & Best 1977 (college, selfish)

12.1.1.123. Beliefs (Stereotypes) About Being Stubborn

Two studies concluded that males are thought of as being more stubborn than females (Table 12.1.1.123).

Table 12.1.1.123. Beliefs (stereotypes) about being stubborn.

Nature of Any Difference					Postpubertal	
						Adult
Males thought to be more						**NORTH AMERICA** *United States*: Sherriffs & McKee 1957:453 (college); Werner & LaRussa 1985 (college)
No signif. difference						
Females thought to be more						

12.1.1.124. Beliefs (Stereotypes) About Being Submissive or Cowardly

One study indicated that males were perceived as more cowardly while another study indicated that females were perceived as being more submissive (Table 12.1.1.124).

Table 12.1.1.124. Beliefs (stereotypes) about being submissive.

Nature of Any Difference					Postpubertal	
						Adult
Males perceived as more						**EUROPE** *Norway*: JE Williams & Best 1977 (college, cowardly)
No signif. difference						
Females perceived as more						**NORTH AMERICA** *United States*: Werner & LaRussa 1985 (college, submissiveness)

12.1.1.125. Beliefs (Stereotypes) About Being Suggestible

The one available study on sex stereotypes in suggestibility concluded that there was no significant difference in the extent to which males or females were thought to be more suggestible (Table 12.1.1.125).

Table 12.1.1.125. Beliefs (stereotypes) about being suggestible.

Nature of Any Difference					Postpubertal	
						Adult
Males perceive as more						
No signif difference						**NORTH AMERICA** *United States*: Werner & LaRussa 1985 (college)
Females perceive as more						

12.1.1.126. Beliefs (Stereotypes) About Being Superstitious

The two studies located on how the sexes are stereotyped with respect to superstition concluded that females are thought to be more so than males (Table 12.1.1.126).

Table 12.1.1.126. Beliefs (stereotypes) about being superstitious.

Nature of Any Difference					Postpubertal	
						Adult
Males thought to be more						
No signif. difference						
Females thought to be more						**NORTH AMERICA** *United States*: Sherriffs & McKee 1957:453 (college); Werner & LaRussa 1985 (college)

12.1.1.127. Beliefs (Stereotypes) About Being Sympathetic

A couple of investigations indicated that females are perceived as more sympathetic toward others than are males (Table 12.1.1.127).

Table 12.1.1.127. Beliefs (stereotypes) about being sympathetic.

Nature of Any Difference					Postpubertal	
						Adult
Males thought to be more						
No signif. difference						
Females thought to be more						**EUROPE** *Netherlands*: Visser 1996:593 (college) **NORTH AMERICA** *United States*: Werner & LaRussa 1985 (college)

12.1.1.128. Beliefs (Stereotypes) About Being Tactful

Two studies concluded that females are stereotyped as being more tactful than males (Table 12.1.1.128).

Table 12.1.1.128. Beliefs (stereotypes) about being tactful.

Nature of Any Difference					Postpubertal	
						Adult
Males thought to be more						
No signif. difference						
Females thought to be more						**NORTH AMERICA** *United States*: Sherriffs & McKee 1957:453 (college); Werner & LaRussa 1985 (college)

12.1.1.129. Beliefs (Stereotypes) About Being Thorough

No significant difference was revealed in the lone study regarding any perceived sex difference in tendencies to be thorough (Table 12.1.1.129).

Table 12.1.1.129. Beliefs (stereotypes) about being thorough.

Nature of Any Difference					Postpubertal	
						Adult
Males thought to be more						
No signif. difference						**NORTH AMERICA** *United States*: Werner & LaRussa 1985 (college)
Females thought to be more						

12.1.1.130. Beliefs (Stereotypes) About Being Tolerant

The tendency to be tolerant toward others, according to one study, was thought to be more characteristic of females than of males (Table 12.1.1.130).

Table 12.1.1.130. Beliefs (stereotypes) about being tolerant.

Nature of Any Difference					Postpubertal	
						Adult
Males perceived as more						
No signif. difference						
Females perceived as more						**NORTH AMERICA** *United States*: Werner & LaRussa 1985 (college)

12.1.1.131. Beliefs (Stereotypes) About Toy Preferences

One study asked adults what types of toys young boys and girls would most like to play with, while another study observed the types of toys offered by adults to young children. Both studies concluded that most people believe or assume that most boys would prefer to play with masculine toys and that most girls would prefer feminine toys (Table 12.1.1.131).

Table 12.1.1.131. Beliefs (stereotypes) about toy preferences.

Nature of Any Difference					Postpubertal	
						Adult
Males thought to prefer masculine toys more & females thought to prefer feminine toys more						**NORTH AMERICA** *United States*: Pomerleau et al. 1990 (toys one would offer to toddlers); Campenni 1999
No signif. difference thought to exist						
Males thought to prefer feminine toys more & females thought to prefer masculine toys more						

12.1.1.132. Beliefs (Stereotypes) About Being Trusting

According to one study, females were more perceived as being more trusting of others than were males (Table 12.1.1.132).

Table 12.1.1.132. Beliefs (stereotypes) about being trusting.

Nature of Any Difference					Postpubertal	
						Adult
Males perceived as more						
No signif. difference						
Females perceived as more						**NORTH AMERICA** *United States*: Werner & LaRussa 1985 (college)

12.1.1.133. Beliefs (Stereotypes) About Being Uninhibited

A study of sex stereotypes having to do with being uninhibited concluded that this adjective was applied more to males than to females (Table 12.1.1.133).

Table 12.1.1.133. Beliefs (stereotypes) about being uninhibited.

Nature of Any Difference	Postpubertal
	Adult
Males perceived as more	**NORTH AMERICA** *United States*: Werner & LaRussa 1985 (college)
No signif. difference	
Females perceived as more	

12.1.1.134. Beliefs (Stereotypes) About Being Unscrupulous/Untrustworthy

Table 12.1.1.134 indicates that one study found males to be perceived to be more untrustworthy than was the case for females.

Table 12.1.1.134. Beliefs (stereotypes) about being unscrupulous/untrustworthy.

Nature of Any Difference	Postpubertal
	Adult
Males perceived as more	**NORTH AMERICA** *United States*: Werner & LaRussa 1985 (college)
No signif. difference	
Females perceived as more	

12.1.1.135. Beliefs (Stereotypes) About Being Vain

According to one study, females were more often than males to be perceived as vain (Table 12.1.1.135).

Table 12.1.1.135. Beliefs (stereotypes) about being vain.

Nature of Any Difference	Postpubertal
	Adult
Males thought to be more	
No signif. difference	
Females thought to be more	**NORTH AMERICA** *United States*: Sherriffs & McKee 1957:453 (college)

12.1.1.136. Beliefs (Stereotypes) About Being Verbally Skilled

A single study of stereotypes regarding the verbal skills of children concluded that girls were perceived as being more skilled than boys (Table 12.1.1.136).

Table 12.1.1.136. Beliefs (stereotypes) about being verbally skilled.

Nature of Any Difference	Prepubertal
	Childhood
Males thought to be more	
No signif. difference	
Females thought to be more	**NORTH AMERICA** *United States*: Palardy 1969 (perceived by teachers)

12.1.1.137. Beliefs (Stereotypes) About Being Victimized Sexually

Two studies concluded that females were perceived as being more likely than males to be the victims of sexual abuse (Table 12.1.1.137).

Table 12.1.1.137. Beliefs (stereotypes) about being victimized sexually.

Nature of Any Difference					Postpubertal		
						Adult	
Males thought to be more often victimized							
No signif. difference							
Females thought to be more often victimized						**NORTH AMERICA** *United States*: Broussard et al. 1991 (college, sexual abuse); HD Smith et al. 1997 (sexual abuse)	

12.1.1.138. Beliefs (Stereotypes) About Being Vindictive

Table 12.1.1.138 shows that one study concluded that females were thought to be more vindictive than was the case for males.

Table 12.1.1.138. Beliefs (stereotypes) about being vindictive.

Nature of Any Difference					Postpubertal		
						Adult	
Males thought to be more							
No signif. difference							
Females thought to be more						**EUROPE** *Norway*: JE Williams & Best 1977 (college)	

12.1.1.139. Beliefs (Stereotypes) About Participating in Wrestling

One study concluded that wrestling was more appropriate as a sport for males than for females (Table 12.1.1.139).

Table 12.1.1.139. Beliefs (stereotypes) about participating in wrestling.

Nature of Any Difference					Postpubertal		
					Adolescent		
Considered more appropriate for males					**NORTH AMERICA** *United States*: BA Riemer & Visio 2003:200		
No signif. difference							
Considered more appropriate for females							

12.1.1.140. Beliefs (Stereotypes) About Being in Science-Related Occupations

According to two studies, both sexes thought that science-related occupations were more appropriate for males than for females (Table 12.1.1.140).

Table 12.1.1.140. Beliefs (stereotypes) about being in science-related occupations.

Nature of Any Difference					Postpubertal		
						Adult	
Considered more appropriate for males						**EUROPE** *Britain*: A Kelly 1985 **NORTH AMERICA** *United States*: Kleinman 1998	
No signif. difference							
Considered more appropriate for females							

12.1.1.141. Trends in Beliefs (Stereotypes) About Sex Differences in Behavior

Several studies have been undertaken to determine if people are becoming more or less likely to believe that males and females are behaviorally different. As shown in Table 12.1.1.141, these studies have all concluded that the proportions of people who rate the sexes as exhibiting different behavioral patterns have remained stable (the specific time frames covered by each study are indicated in parentheses).

Table 12.1.1.141. Trends in beliefs (stereotypes) about sex differences in behavior.

Nature of Any Difference	Postpubertal		Multiple Age Categories
	Adolescent	Adult	
Decrease in recent decades			
No signif. difference	**NORTH AMERICA** *United States*: DE Bush et al. 1978 (1968-1975)	**EUROPE** *Norway*: Bjerke et al. 1989 (1977-1987) **NORTH AMERICA** *United States*: RO Baldwin 1984 (1970-1981); Lueptow et al. 1995:524 (1974-1991)	**NORTH AMERICA** *United States*: Neufeld et al. 1974 (1950-1970); Der-Karabetian & Smith 1977:193 (1965-1975); ME Heilman et al. 1989 (1980-88)
Increase in recent decades			

12.1.2. Other Beliefs or Judgments Concerned With Gender Differences

Some beliefs and judgments about males and females do not fit well into the category of stereotypes. The results of research surrounding these beliefs and judgments are reviewed below.

12.1.2.1. Correctly Judging Someone's Gender Based Entirely on Writing Style

As a way of determining if males and females express themselves differently linguistically, some researchers have asked men and women to write a brief (usually one-page) essay on some assigned topic. These essays are then given to other men and women (judges) who are asked to guess the sex of the writer. Table 12.1.2.1 shows that in all of these studies, the judges were well above chance levels in accuracy.

Table 12.1.2.1. Correctly judging someone's gender based entirely on writing style.

Nature of Any Difference	Prepubertal	Postpubertal	Multiple Age Categories
	Childhood	Adult	
Above chance accuracy	**EUROPE** *Britain*: J Hartley 1991:143	**NORTH AMERICA** *United States*: PT Young 1931*; Tenwolde 1934; Goodenough 1945; D Lester et al. 1979 **OCEANIA** *New Zealand*: Janssen & Murachver 2005	**EUROPE** *France*: Binet 1906 **NORTH AMERICA** *United States*: Downey 1910; Kinder 1926; Newhall 1926; ME Broom et al. 1929; PT Young 1931*; P Eisenberg 1938; WC Middleton 1938; McCullough 1987
Chance level of accuracy			
Below chance accuracy		**NORTH AMERICA** *United States*: Mulac et al. 1990 (college); Mulac & Lundell 1994	

12.1.2.2. Social Acceptability of Opposite Sex Activities

According to at least three studies, people are generally more accepting or approving of females engaging in activities that are more typical of the opposite sex than they are of males doing so (Table 12.1.2.2).

Table 12.1.2.2. Social acceptability of opposite sex activities.

Nature of Any Difference	Prepubertal
	Childhood
More acceptable for males	
No signif. difference	
More acceptable for females	**NORTH AMERICA** *United States*: Fagot 1977; R Shell & Eisenberg 1990; KJ Zucker et al. 1995

12.1.2.3. Beliefs About Blame for Domestic Violence Committed Against Women

A few studies have compared men and women with respect to which sex they believed was more blameworthy with respect to instances of domestic violence (committed by others, not by themselves). As shown in Table 12.1.2.3, all of these studies found that both sexes were more likely to blame the opposite sex than their own sex for the violence that occurred.

Table 12.1.2.3. Beliefs about blame for domestic violence committed against women.

Nature of Any Difference	Postpubertal
	Adult
Same sex more blameworthy	
No signif. difference	
Opposite sex more blameworthy	**NORTH AMERICA** *United States*: M Pierce & Harris 1993 (college); RJ Harris & Cook 1994 (college); Schuller et al. 1994; Locke & Richman 1999 (college)

12.1.2.4. Beliefs That Smiling Reflects Joy

Two studies concluded that females were more likely than males to believe that smiling was a reflection of joyful emotions (Table 12.1.2.4).

Table 12.1.2.4. Beliefs that smiling reflects joy.

Nature of Any Difference	Postpubertal
	Adult
Males perceived smiles as reflecting joy more	
No signif. difference	
Women perceived smiles as reflecting joy more	**NORTH AMERICA** *United States*: HL Wagner et al. 1993; Hess et al. 1997

12.1.2.5. Importance of Offspring's Career to the Parent

One survey was undertaken in which parents were asked to rate the importance of career development as a consideration in rearing their children. Both mothers and fathers rated this factor as more important for their sons than for their daughters (Table 12.1.2.5).

Table 12.1.2.5. Importance of offspring's career to the parent.

Nature of Any Difference	Citation
Son's career development considered more important	**OCEANIA** *Australia*: Farnill 1986
No signif. difference	
Daughter's career development considered more important	

12.1.2.6. Perception of Clothing in Sexual Terms

One study concluded that most people consider women's clothing in sexual terms to a greater degree than men's clothing (Table 12.1.2.6).

Table 12.1.2.6. Perception of clothing in sexual terms

Nature of Any Difference	Postpubertal
	Adolescent
Male clothing perceived as more	
No signif. difference	
Female clothing perceived as more	**NORTH AMERICA** *United States*: Zellman & Goodchilds 1983 (by both sexes)

12.1.2.7. Beliefs About Job Discrimination

According to the one available study, females were more likely than males to expect to be the object of discrimination with regard to their starting salary (Table 12.1.2.5).

Table 12.1.2.7. Beliefs about job discrimination.

Nature of Any Difference	Postpubertal
	Adult
Males expect more	
No signif. difference	
Females expect more	**NORTH AMERICA** *United States*: Antecol & Kuhn 2000 (young, starting pay)

12.1.2.8. Sex of "False Name of Famous People" Effect

The "false name of famous people" effect occurs when people erroneously judge familiar names as being those of someone famous. According to the available studies, this effect is more common with the names of males than with those of females (Table 12.1.2.8).

Table 12.1.2.8. Sex of "false name of famous people" effect.

Nature of Any Difference					Postpubertal		
						Adult	
Males more						**EUROPE** *Germany*: Buchner & Wippich 1996; Buchner et al. 2000; Steffens et al. 2004 **NORTH AMERICA** *United States*: Banaji & Greenwald 1995	
No signif. difference							
Females more							

12.1.2.9. Interpretation of Emotional Expression Based on the Individual's Presumed Gender

In one experiment, adults were shown pictures of infants with emotion-filled expressions. If the subjects were told that the photo was of a baby boy, they were more likely to report that the expression was one of anger than of fear. The opposite pattern occurred if subjects were told that the photo was of a baby girl (Table 12.1.2.9).

Table 12.1.2.9. Interpretation of emotional expression based on the individual's presumed gender.

Nature of Any Difference	Prepubertal						
	Infant						
Males seen as more angry/less fearful	**NORTH AMERICA** *United States*: Condry & Condry 1976 (adult interpreters)						
No signif. difference							
Females seen as more angry/less fearful							

12.1.3. Assessment of Others Based on Gender

Some research has been undertaken to determine if the gender of others is related to how they are assessed. The findings from this research are summarized below.

12.1.3.1. Evaluation of Parental Intelligence by an Offspring

Some studies have sought to determine whether offspring perceive a difference in the psychometric intelligence of their mothers and fathers. Psychometric intelligence (or simply intelligence) refers to the ability to cognitively absorb information from one's environment and use that information to effectively guide one's future actions. Table 12.1.3.1 shows that there were either no significant differences in the assessments of mothers and fathers regarding intelligence or fathers were believed to have higher intelligence than mothers.

Table 12.1.3.1. Evaluation of parental intelligence by an offspring.

Nature of Any Difference					Postpubertal		
						Adult	
Father rated higher						**EUROPE** *Britain*: Petrides et al. 2004 (college) **NORTH AMERICA** *United States*: H Hogan 1978 (college); Beloff 1992 (college)	
No signif. difference						**EUROPE** *Britain*: Furnham et al. 1999 (young); Furnham et al. 2002 (young) **OCEANIA** *New Zealand*: Byrd & Stacey 1993 (college)	
Mother rated higher							

12.1.3.2. Evaluation of Offspring's Intelligence by a Parent

In a limited number of studies, parents have been asked to rate the intelligence of their sons and daughters. According to all of these studies, parents perceive their sons on average to be more intelligent than they perceive their daughters (Table 12.1.3.2).

Table 12.1.3.2. Evaluation of offspring's intelligence by a parent.

Nature of Any Difference	Multiple Age Categories
Son rated higher	**EUROPE** *Britain*: Furnham & Gasson 1998; Furnham et al. 2002 **OCEANIA** *Australia*: Furnham & Petrides 2004
No signif. difference	
Daughter rated higher	

12.1.3.3. Evaluation of Parental "Emotional Intelligence"

"Emotional intelligence" has been defined as the ability to sense and understanding the emotional feelings of oneself and others and to use such an understanding to guide one's thinking and actions toward others (Salovey & Mayer 1990:189). According to the single study of this phenomenon, mothers are perceived by their offspring (of both sexes) as having higher emotional intelligence than do their fathers (Table 12.1.3.3).

Table 12.1.3.3. Evaluation of parental "emotional intelligence".

Nature of Any Difference	Postpubertal
	Adult
Father rated higher	
No signif. difference	
Mother rated higher	**EUROPE** *Britain*: Petrides et al. 2004 (college)

12.1.3.4. Evaluation of Sex Difference in Student Academic Ability

According to one study, grade school teachers did not perceive any significant sex difference in the academic abilities of their students. However, a study of high school teachers concluded that female students were thought to have greater academic ability than male students (Table 12.1.3.4).

Table 12.1.3.4. Evaluation of sex difference in student academic ability.

Nature of Any Difference	Prepubertal	Postpubertal
	Childhood	Adolescent
Male rated higher		
No signif. difference	**NORTH AMERICA** *United States*: Jussim & Eccles 1995 (by teachers)	
Female rated higher		**NORTH AMERICA** *United States*: Wright & Houck 1995 (high school teacher rating)

12.1.3.5. Evaluation of Another's Facial Attractiveness

Several studies have explored gender differences in facial attractiveness, including the types of features that males or females possess that elicit increased or decreased attractiveness assessments. Generally, female faces are considered more attractive except during infancy when no differences seem to exist. One study found that darkening the eye region and the mouth (termed *luminance*) resulted in females being rated more attractive whereas doing so for males decreased their attractiveness ratings (Table 12.1.3.5).

Table 12.1.3.5. Evaluation of another's facial attractiveness.

Nature of Any Difference	Postpubertal
	Adult
Males give higher ratings	**NORTH AMERICA** *United States*: R Russell 2003* (when eye region & mouth are not darkened relative to the remainder of the face)
No signif. difference	**NORTH AMERICA** *United States*: Hildebrandt & Fitzgerald 1983 (attractiveness of male & female infants as judged by adults)
Females give higher ratings	**EUROPE** *Britain*: Furnham & Radley 1989 (young, females give higher ratings by both sexes in terms of physical attractiveness) **NORTH AMERICA** *United States*: Hammes 1964 (college, evaluating pleasantness/unpleasantness); Bruce et al. 1993; O'Toole et al. 1998; R Russell 2003* (when eye region & mouth are darkened relative to the remainder of the face)

12.1.3.6. Evaluation of Employee by Supervisor/Employer

Quite a number of studies have been undertaken to determine if men or women receive higher ratings by their supervisors or employers. As one can see in Table 12.1.3.6, most of these studies have concluded that either there is no significant gender difference in ratings received or that females are usually more highly rated than males.

Table 12.1.3.6. Evaluation of employee by supervisor/employer.

Nature of Any Difference					Postpubertal		Multiple Age Categories
						Adult	
Males given higher ratings							**NORTH AMERICA** *United States*: McKee & Sherriffs 1957; Woehr & Roch 1996
No signif. difference						**NORTH AMERICA** *United States*: LF Shore & Thorton 1986 (manufacturing); Griffeth & Bedeian 1989 (accountants)	**NORTH AMERICA** *United States*: FS Hall & Hall 1976; RD Arvey et al. 1977; N Schmitt & Lappin 1980; Pulakos & Wexley 1983; LH Peters et al. 1984*; Grams & Schwab 1985; Pulakos et al. 1989; M Johnson & Helgeson 2002 (banking industry); Tang 1996:141 (recommended raises) **OCEANIA** *Australia*: Pirri et al. 1995 (experimental)
Females given higher ratings							**MIDDLE EAST** *Israel*: Pazy & Oron 2001 (when workforce proportions favored women, military officers) **NORTH AMERICA** *United States*: Hamner et al. 1974; KM Bartol & Butterfield 1976; M London & Poplawski 1976; WH Mobley 1982 (wholesalers); LH Peters et al. 1984* (adult retail sales staff); Eagly & Mladinic 1989; Eagly et al. 1991; PR Sackett et al. 1991 (when workforce proportions favored women, businesses); Haddock & Zanna 1994; Skowronski & Lawrence 2001 (adult & adolescent except as soldiers where males rate males more favorably)

12.1.3.7. Evaluation of the Quality of Writing According to the Presumed Sex of the Writer

Several experimental studies have given male and female raters (such as teachers) samples of writing (such as a term paper) supposedly written by "Johnny" as opposed to "Suzy" and asked them to rate the quality of the writing or the accuracy of the information contained within the writing sample. These studies have specifically manipulated the supposed sex of the "writer" so as to ensure that any average differences in ratings only reflects "biases" by the raters.

As shown in Table 12.1.3.7, the results have been mixed with respect to any rater biases. When biases have been found, they tend to be in the direction of males being given higher ratings for writing on "masculine topics" (such as law and city planning), whereas females receive higher ratings for writing on "feminine topics" (such as dietetics).

Table 12.1.3.7. Evaluation of the quality of writing according to the presumed sex of the writer.

Nature of Any Difference					Postpubertal		
					Adolescent	Adult	
Higher ratings for males					**NORTH AMERICA** *United States*: HN Mischel 1974* (law & city planning)	**NORTH AMERICA** *United States*: PA Goldberg 1968* (law & city planning, female evaluators); Pheterson et al. 1971 (artistic works); Etaugh & Sanders 1974 (artistic works); HN Mischel 1974* (city planning); Paludi & Bauer 1983; Paludi & Strayer 1984	
No signif. difference					**NORTH AMERICA** *United States*: HN Mischel 1974* (city planning)	**NORTH AMERICA** *United States*: PA Goldberg 1968* (education & dietetics, female evaluators); HN Mischel 1974* (primary education, dietetics, city planning & law); H Levinson et al. 1975	
Higher ratings for female					**NORTH AMERICA** *United States*: HN Mischel 1974* (dietetics & primary education)	**NORTH AMERICA** *United States*: HN Mischel 1974* (dietetics)	

12.1.3.8. Peer Review of Manuscripts According to the Presumed Sex of the Writer

Among social/behavioral scientists who served as manuscript reviewers for various professional journals, male and female reviewers were sent manuscripts in which the supposed authors were either two male coauthors or two female coauthors. The supposed authorship of these manuscripts was in fact randomly assigned by those conducting the experiment. The study revealed that the recommendations for acceptance/rejection of the manuscripts were unaffected by male reviewers. Female reviewers, on the other hand, were much more likely to recommend acceptance of manuscripts supposedly authored by females than they were the same manuscripts when supposedly authored by males (Table 12.1.3.8).

Table 12.1.3.8. Peer review of manuscripts according to the presumed sex of the writer.

Nature of Any Difference	Postpubertal	
		Adult
Higher ratings given to manuscripts supposedly written by males		
No signif. difference		**NORTH AMERICA** *United States*: ME Lloyd 1990* (social science, male reviewers)
Higher ratings given to manuscripts supposedly written by females		**NORTH AMERICA** *United States*: ME Lloyd 1990* (social science, female reviewers)

12.1.3.9. Voting Preferences According to the Sex of the Candidate

The studies that have sought to determine if voters are more likely to favor male or female political candidates (with otherwise equal qualifications) have concluded that either no significant difference exists or that in the case of male voters, males were preferred, and in the case of female voters, the sex of the candidate made no difference (Table 12.1.3.9).

Table 12.1.3.9. Voting preferences according to the sex of the candidate.

Nature of Any Difference			Multiple Age Categories
Males preferred			**MIDDLE EAST** *Israel*: Lobel et al. 2000* (by Jewish and Arab early adolescent males) **NORTH AMERICA** *United States*: Sigelman et al. 1986* (male voters), RL Fox & Smith 1998 (by both sexes); KJ Flannelly 2002 (by both sexes)
No signif. difference			**NORTH AMERICA** *United States*: R Darcy et al. 1994; Sigelman et al. 1986* (female voters)
Females preferred			**MIDDLE EAST** *Israel*: Lobel et al. 2000* (by Jewish and Arab early adolescent females)

12.1.4. Accepting/Approving Attitudes Relative to an Individual's Sex

A relatively small group of studies have investigated people's accepting or approving attitudes toward others based on the gender of the other person. Findings from these studies are reviewed below.

12.1.4.1. Attitudes Toward Others in Relationship to Their Gender in General

According to the available research, adults generally have more approving attitudes toward the social interactions they have with school age girls than with school age boys, or there are no significant gender differences in people's desirability ratings (Table 12.1.4.1).

Table 12.1.4.1. Attitudes toward others in relationship to their gender in general.

Nature of Any Difference					Postpubertal	
						Adult
Approval for males more						
No signif. difference						**NORTH AMERICA** *United States*: Antill 1983 (full, social desirability rating) **OCEANIA** *Australia*: Farnill & Ball 1985:209 (young, social desirability rating)
Approval for females more						**NORTH AMERICA** *United States*: Heyman 2001 (toward school age behavior)

12.1.4.2. Attitudes Toward Aggression and Violence Depending on the Sex of the Aggressor

Several studies have asked adults their opinions concerning aggression or violence with respect to which gender is being the aggressor. Except in the case of play-fighting, adults of both sexes are more disapproving of males behaving aggressively than they are of females doing so (Table 12.1.4.2).

Table 12.1.4.2. Attitudes toward aggression and violence depending on the sex of the aggressor.

Nature of Any Difference					Postpubertal	
						Adult
Disapprove of more when aggressor is male						**NORTH AMERICA** *United States*: Greenblat 1983 (spousal violence); MB Harris 1991 (college); MB Harris 1994 (college); MB Harris & Knight-Bohnhoff 1996 (college); Graham et al. 2004 (among couples)
No signif. difference						
Disapprove of more when aggressor is female						**NORTH AMERICA** *United States*: Condry & Ross 1985 (college, play-fighting)

12.1.4.3. Approval of a "Double Standard" in Attitudes Toward Premarital Sex

Studies of the so-called "double standard" regarding premarital sex have found that either both men and women are more accepting of males having premarital sex than of females doing so or they have been equally likely to be non-accepting of this behavior for both sexes (Table 12.1.4.3).

Table 12.1.4.3. Approval of a "double standard" in attitudes toward premarital sex.

Nature of Any Difference					Postpubertal		
						Adult	
More acceptable for males than for females						**ASIA** *Russia*: Sprecher & Hatfield 1996* (college) **MIDDLE EAST** *Iran*: Shapurian & Hojat 1985 (college) **NORTH AMERICA** *United States*: Garcia & Derfel 1983 (being promiscuous); Sprecher et al. 1987; Sprecher & Hatfield 1996* (college)	
No signif. difference						**ASIA** *Japan*: Sprecher & Hatfield 1996* (college) **NORTH AMERICA** *United States*: Sprecher et al. 1988 (college); Sprecher 1989 (college)	
More acceptable for females than for males							

12.1.4.4. Approval of Smoking According to the Sex of the Smoker

Two of the three studies undertaken to determine if people are more approving (or at least accepting) of smoking by males or by females revealed that acceptance is greater for males than for females. The remaining study found the opposite (Table 12.1.4.4).

Table 12.1.4.4. Approval of smoking according to the sex of the smoker.

Nature of Any Difference					Postpubertal		
					Adolescent		
More acceptable for males than for females					**NORTH AMERICA** *United States*: Elkind 1985 (by classmates in high school); Waldron 1991 (by parents)		
No signif. difference							
More acceptable for females than for males					**NORTH AMERICA** *United States*: Barton et al. 1982 (by 6th graders)		

12.1.4.5. Value/Worthiness of Males and Females

A few studies have sought to determine if one sex is valued more than the other. As shown in Table 12.1.4.5, most of these studies have concluded that both male and female respondents consider females to be of greater value than males. Perhaps it is noteworthy that the only two exceptional studies were conducted in the 1940s and 1950s, while the remaining studies were carried out in the 1980s and 1990s.

Table 12.1.4.5. Value/worthiness of males and females.

Nature of Any Difference					Postpubertal		Multiple Age Categories
						Adult	
Males valued more						**NORTH AMERICA** *United States*: Roper 1946	**NORTH AMERICA** *United States*: McKee & Sherriffs 1957 (by both sexes)
No signif. difference							
Females valued more						**NORTH AMERICA** *Canada*: Eagly et al. 1991 (college, attitudes toward women more positive by both sexes); *United States*: Eagly & Mladinic 1989 (college, attitudes toward women more positive by both sexes); Eagly & Mladinic 1994 (college, attitudes toward women more positive by both sexes)	

12.1.4.6. Sex Bias in Child Rearing

A couple of studies were conducted to determine if adult males or females were biased as far as raising their children in terms of time devoted to child rearing. Both studies concluded that males spent more time rearing male offspring than female offspring, but that women did not bias their rearing on the basis of the sex of the offspring (Table 12.1.4.6).

Table 12.1.4.6. Sex bias in child rearing.

Nature of Any Difference					Postpubertal	
						Adult
Males more						**NORTH AMERICA** *United States*: Fagot & Leinbach 1987 (married couples); M Siegal 1987 (married couples)
No signif. difference						
Females more						

12.1.4.7. Attitudes Toward People Who Are Overweight

Physical attractiveness appears to be partially assessed on the basis of body weight. Research has indicated that attractiveness is more harshly judged if females are overweight than if males are comparably so (Table 12.1.4.7).

Table 12.1.4.7. Attitudes towards people who are overweight.

Nature of Any Difference					Postpubertal	
						Adult
Males attractiveness is diminished more						
No signif. difference						
Females attractiveness is diminished more						**EUROPE** *England*: M Harris et al. 1982 (young, judges of both sexes); Furnham & Radley 1989 (young, judges)

12.1.5. Preferences According to Another's Gender

Numerous studies have sought evidence under a variety of circumstances that one sex was preferred over the other. The findings from these studies are reviewed below.

12.1.5.1. Parental Preference Regarding the Sex of Their Offspring

Many studies have sought to determine the preferences of parents regarding the sex of their offspring. Table 12.1.5.1 indicates that in most parts of the world, males are preferred by most parents who are wishing to have children. This is especially true for couples seeking to have their first child, and seems to be more true for male parents than for female parents.

According to Downey et al. (1994:37), the tendency to prefer male over female children is universal. The summary of findings presented suggests that there may be at least a few exceptions to this generalization.

Table 12.1.5.1. Parental preference regarding the sex of their offspring.

Nature of Any Difference	Citations
Males preferred	**AFRICA** *Egypt*: Gadalla et al. 1985; Aly & Shields 1991; Inhorn 1994* (rural); Inhorn 1996; *Ghana*: Salada 1984; *Moracco*: Obermeyer 1999; *Nigeria*: Okore 1977; Oruboloye 1987; *Sierra Leone*: M McClulloch 1964; E K Campbell 1991 (by males); *Tunisia*: Beaujot 1988 **ASIA** *Bangladesh*: D'Souza & Chen 1980; Ahmed 1981; Hossain & Glass 1988; Chowdury et al. 1993 (by fathers); M Rahman & DaVanzo 1993; *China*: Coale & Banister 1994; J Lee et al. 1994 (in the 19th Century); Li & Cooney 1993; Tu 1991; Poston et al. 1997; *Korea*: CB Park 1983; Malhi 1993; CB Park & Cho 1995; Larsen et al. 1998; *Malaysia*: Pong 1994; *Nepal*: Niraula & Morgan 1996; *Vietnam*: Dang 1995; Haughton & Haughton 1995; Le et al. 2001 **EUROPE** *Britain*: Gervai et al. 1995:119* (fathers); *Hungary*: Gervai et al. 1995:119* **MIDDLE EAST** *India*: Ramanamma & Bambawale 1980 (first birth); Nath & Land 1994 (by couples); *Pakistan*: Sather 1987 **NORTH AMERICA** *United States*: CC Peterson & Peterson 1973 (as first or only child); Coombs et al. 1975 (by fathers); L Hoffman 1977 (by fathers); Pebley & Westoff 1982 (for first-born); Gilroy & Steinbacher 1983; Fagot & Leinbach 1987 (fathers); Siegal 1987 (fathers); Steinbacher & Ericsson 1994; Steinbacher & Gilroy 1996 **OCEANIA** *Australia*: Birdsell 1972:355 (19th Century, aborigines at the time of European settlement); *Philippines*: Stinner & Mader 1975:183 (for first birth); Stinner & Mader 1975 (Muslims) **INTERNATIONAL** *Multiple Countries*: Chu & Yu 1998* (by men); *Multiple Asian Countries*: Das Gupta 1999; Croll 2000
No signif. difference	**AFRICA** *Egypt*: Inhorn 1994* (urban) **EUROPE** *Netherlands*: Veldkamp Marktonderzoek 1996; Netherlands Institute for Public Opinion and Market Research 1997 **MIDDLE EAST** *Israel*: Chu & Yu 1998* (by women) **NORTH AMERICA** *United States*: NE Williamson 1976
Females preferred	**LATIN AMERICA** *Jamaica*: C Sargent & Harris 1992; *Multiple Latin American Countries*: Chu & Yu 1998* (by women)

12.1.5.2. Choice of Social Interactants (Same Versus Opposite Sex)

Related to the concept of popularity is that of the choices made in socially interacting with others. The studies summarized in Table 12.1.5.2 pertain to whether or not individuals choose to interact with their own sex or the opposite sex. At least prior to puberty, research has revealed consistent tendencies to bias one's social interactions toward members of one's own sex.

Table 12.1.5.2. Choice of social interactants (same versus opposite sex).

Nature of Any Difference	Prepubertal					
		Toddler	Early Childhood	Childhood		
Same sex chosen more		**EUROPE** *Switzerland*: Chevaleva-Janovskajo 1927 (both sex interact with same-sex peers) **NORTH AMERICA** *Canada*: La Freniere et al. 1984; *United States*: Maccoby & Jacklin 1987	**NORTH AMERICA** *United States*: Parten 1933; EH Green 1933; EH Green 1933a (both sex interact with same-sex peers, preschool); Parten 1933 (both sex interact with same-sex peers, preschool); McCandless & Hoyt 1961; AH Clark et al. 1969; Serbin et al. 1977; Goldman 1981; T Field 1982; Phinney & Rotheram 1982; Lederberg et al. 1986; Feiring & Lewis 1987; Hines & Kaufman 1994	**AFRICA** *Kenya*: Harkness & Super 1985 **LATIN AMERICA** *Brazil*: de Guzman et al. 2004 **NORTH AMERICA** *United States*: Maccoby 1980; Pitcher & Schultz 1983; La Freniere et al. 1984 (researchers observations); Lockheed 1986 (sociometric ratings); Belle 1989; JA Graham et al. 1998 (expressed preferences); Boyatzis et al. 1999 (researchers observations) **PRIMATE (EXCEPT APE)** *Rhesus Macaque*: Nieuwenhuijsen et al. 1988:362		
No signif. difference						
Opposite sex chosen more						

12.1.5.3. Choice of Playmates (Specific Sex Chosen)

The specific sex of one's playmates or associates has been investigated in a few human studies and a couple of nonhuman primate (except ape) studies. As shown in Table 12.1.5.3, all of these studies have concluded that males are chosen more often than females as playmates.

Table 12.1.5.3. Choice of playmates (specific sex chosen).

Nature of Any Difference	Prepubertal				Postpubertal	
			Early Childhood	Childhood	Adolescent	
Males chosen more			**NORTH AMERICA** *United States*: Koch 1944; Abel & Sahinkaya 1962	**NORTH AMERICA** *United States*: Kohlberg 1966:119	**PRIMATE (EXCEPT APE)** *Japanese Macaques*: Azuma 1974; Nakamichi 1989	
No signif. difference						
Females chosen more						

12.1.5.4. Conspecific Preferences According to Gender

Table 12.1.5.4 indicates that female rodents exhibited stronger conspecific preferences than did males. In other words, when given a choice between their own species and a closely related one, females were more prone to choose their own than were males.

Table 12.1.5.4. Conspecific preferences according to gender.

Nature of Any Difference					Postpubertal
					Adult
Males preferred more					
No signif. difference					
Females preferred more					**RODENT** *Rat*: Eliasson & Meyerson 1981; Vega Matuszczyk & Larsson 1993; Vega Matuszczyk et al. 1994; HH Lopez et al. 1999:180

12.1.5.5. Preference for Displaying Gender Dominance

Several studies have sought to determine if people prefer dominating types of behavior to be displayed by one gender more than by the other. While dominance displays are generally frowned upon, if it is necessary to be endured, most seem to prefer that it comes from males rather than from females (Table 12.1.5.5).

Table 12.1.5.5. Preference for displaying gender dominance.

Nature of Any Difference	Postpubertal
	Adult
Prefer that it comes from males	**NORTH AMERICA** *United States*: Schein 1973 (prefer males); Schein 1975 (prefer males); Brenner et al. 1989 (males prefer males); CL Copeland et al. 1995; Rudman 1998; Schein 2001 (males prefer males)
No signif. Difference	
Prefer that it comes from females	

12.1.5.6. Preference for the Voice of Others as Related to Gender

Ratings given to people's voices in terms of pleasantness have shown that male voices receive higher ratings than do female voices in the three studies conducted (Table 12.1.5.6).

Table 12.1.5.6. Preference for the voice of others as related to gender.

Nature of Any Difference	Prepubertal	Postpubertal
	Toddler	Adult
Male voices preferred	**NORTH AMERICA** *United States*: Masataka & Bloom 1994 (adult raters)	**NORTH AMERICA** *United States*: Pittam 1987* **OCEANIA** *Australia*: Pittam 1987*
No signif. Difference		
Female voices preferred		

12.1.5.7. Persuasiveness of a Person's Voice Based on Their Sex

The one study on the persuasiveness of a person's voice concluded that voices of females tended to be more persuasive than those of males (Table 12.1.5.7).

Table 12.1.5.7. Persuasiveness of a person's voice based on their sex.

Nature of Any Difference	Postpubertal
	Adult
Male voice more	
No signif. difference	
Female voice more	**NORTH AMERICA** *United States*: Batestone & Tuomi 1981 (young)

12.1.5.8. Preference for the Gender of One's Supervisor/Manager/Leader

Research concerning which gender one would prefer to have as a supervisor, manager, or leader has concluded that males are more often preferred, typically by both males and females (Table 12.1.5.8). (Also see Table 12.1.3.9.)

Table 12.1.5.8. Preference for the gender of one's supervisor/manager/leader.

Nature of Any Difference	Postpubertal	Multiple Age Categories
	Adult	
Males preferred	**NORTH AMERICA** *United States*: Schein 1975 (by both sexes); Brenner et al. 1989 (by males); Covin & Brush 1991:407 (by both sexes); RL Fox & Smith 1998 (political candidate, by both sexes); Schein 2001 (by males); KJ Flannelly 2002 (political candidate, by both sexes)	**NORTH AMERICA** *United States*: Osborn & Vicars 1976 (managers); Dubno 1985 (by both sexes); Sutton & Moore 1985 (by both sexes); Liden 1985 (explained by more experience of male managers)
No signif. difference		
Females preferred	**NORTH AMERICA** *United States*: RJ Simon & Landis 1989 (by females); Javidan et al. 1995 (preference as role model)	

12.1.5.9. Preference for the Gender of One's Physician or Psychotherapist

A few studies have sought to determine if people have a preference for the sex of their physician or psychotherapist, and have concluded that male psychotherapists were preferred (Table 12.1.5.9).

Table 12.1.5.9. Preference for the gender of one's physician or psychotherapist.

Nature of Any Difference	Postpubertal	Multiple Age Categories
	Adult	
Males preferred	**NORTH AMERICA** *United States*: Stamler et al. 1991 (psychotherapist); JA Hall et al. 1994b (physician in general)	**NORTH AMERICA** *United States*: Chesler 1971 (psychotherapist)
No signif. difference		
Females preferred		

12.1.5.10. Preference for the Gender of Nurses Providing Treatment/Care

A lone study was undertaken to determine whether male or female nurses were preferred by persons receiving nursing care. This study revealed that both sexes preferred female nurses; and was especially pronounced among female respondents (Table 12.1.5.10).

Table 12.1.5.10. Preference for the gender of nurses providing treatment/care.

Nature of Any Difference	Multiple Age Categories
Males preferred more	
No signif. difference	
Females preferred more	**OCEANIA** *Australia*: Chur-Hansen 2002

12.1.5.11. Preference for Employees According to Gender

In a few studies, prospective employers have been asked if they would prefer to fill a job opening with a male or a female employee. Most of these studies have concluded that employers prefer a male, especially when filling managerial positions (Table 12.1.5.11).

Table 12.1.5.11. Preference for employees according to gender.

Nature of Any Difference	Postpubertal
	Adult
Males preferred more	**NORTH AMERICA** *United States*: Dipboye et al. 1977 (management position); TF Cash & Kilcullen 1985 (management position); Drogosz & Levy 1996
No signif. difference	
Females preferred more	**ASIA** *China*: Chiu & Babcock 2002

12.1.5.12. Preference for Physical Features of Others According to Their Gender

According to one study, the physical features of females were preferred to those of males by both sexes (Table 12.1.5.12).

Table 12.1.5.12. Preference for physical features of others according to their gender.

Nature of Any Difference	Postpubertal
	Adult
Males more preferred	
No significant difference	
Females more preferred	**NORTH AMERICA** *United States*: Oliver-Rodrigues et al. 1999:179 (more wide-opened pupils)

12.1.5.13. Preference for Male Odor

The one study of preferences for male odors involved rats and concluded that females exhibited a greater preference for this odor than did males (Table 12.1.5.13).

Table 12.1.5.13. Preference for male odor.

Nature of Any Difference	Postpubertal
	Adult
Greater by males	
No signif. difference	
Greater for females	**RODENT** *Rat*: J Bakker et al. 1996 (bedding soiled by males)

12.1.5.14. Preference for Female Odor

Both humans and rodents have been studied with regard to the tendency to prefer the odor of females. The evidence is somewhat inconclusive, but tends toward indicating that males prefer female odors to a greater degree than do females (Table 12.1.5.14).

Table 12.1.5.14. Preference for female odor.

Nature of Any Difference	Postpubertal	
		Adult
Greater by males		**EUROPE** *Finland:* Kuukasjarvi et al. 2004 (attraction by females during ovulation) **RODENT** *Rat*: J Bakker et al. 1996 (bedding soiled by females)
No signif. difference		**RODENT** *Rat*: Xiao et al. 2004 (sexually active animals)
Greater by females		

12.2
PHYSIOLOGICAL AND COGNITIVE RESPONSES TO OTHERS BASED ON SEX

Some studies have examined how people physiologically and cognitively respond based on the sex someone else with whom they are proximate or are interacting. Results are summarized below.

12.2.1. Cognitive and Perceptual Responses

A variety of cognitive and perceptual factors have been investigated in connection with the sex of the individual being confronted. Findings are revealed in the following tables.

12.2.1.1. Cues Needed to Identify a Male/Female Face

One study concluded that more cues are needed for the average person to recognize a female face relative to recognizing a male face (Table 12.2.1.1).

Table 12.2.1.1. Cues needed to identify a male/female face.

Nature of Any Difference					Postpubertal	
						Adult
Male faces need more						
No signif. difference						
Female faces need more						**EUROPE** *Italy*: Cellerino et al. 2004

12.2.1.2. Contracting Diabetes According to the Sex of One's Diabetic Parent

According to three studies, offspring are more likely to be diabetic if their father was diabetic than if their mother was diabetic (Table 12.2.1.2).

Table 12.2.1.2. Contracting diabetes according to the sex of one's diabetic parent.

Nature of Any Difference							Multiple Age Categories
Male parent more							**EUROPE** *Finland*: Tillil & Kobberling 1987 **NORTH AMERICA** *United States*: Warram et al. 1984; Bleich et al. 1993
No signif. difference							
Female parent more							

12.2.1.3. Reports of Pain According to the Sex of the Investigator

One experiment conducted among male subjects only reported that its subjects experienced greater levels of pain to a male investigator than to a female investigator, when the pain inducing stimuli used were identical (Table 12.2.1.3).

Table 12.2.1.3. Reports of pain according to the sex of the investigator.

Nature of Any Difference					Postpubertal	
						Adult
More pain in response to males						**NORTH AMERICA** *United States*: Levine & DeSimone 1991 (among all male subjects)
No signif. Difference						
More pain in response to females						

12.2.1.4. Human Chorionic Gonodotropin (hCG) Levels of Mothers Depending on Sex of Fetus

According to one study, mothers who are carrying a female fetus exhibit higher levels of a hormone known as human chorionic gonadotropin (Table 12.2.1.4).

Table 12.2.1.4. Human chorionic gonodotropin (hCG) levels of mothers depending on sex of fetus.

Nature of Any Difference					Postpubertal	
						Adult
Male fetus mother higher						
No signif. Difference						
Female fetus mother higher						**EUROPE** *Finland*: Kauppila et al. 1979

12.2.1.5. Memory by Mothers Depending on Sex of Offspring

An investigation of mothers suggested that at the time of pregnancy, those who were carrying male fetuses had better working memory than did those who were carrying female fetuses (Table 12.2.1.5).

Table 12.2.1.5. Memory by mothers depending on sex of offspring.

Nature of Any Difference					Postpubertal	
						Adult
Mothesr of males more						**NORTH AMERICA** *Canada*: Vanston & Watson 2005 (working memory)
No signif. Difference						
Mothers of females more						

12.2.1.6. Spatial Reasoning of Mothers Depending on Sex of the Offspring

One study found that mothers who were pregnant with male fetuses exhibited better spatial reasoning than did mothers with female fetuses (Table 12.2.1.6). The most reasonable explanation for this observation, should it be confirmed, is that the testosterone being produced by male fetuses is enhancing the ability of the mother's brain to process spatial information.

Table 12.2.1.6. Spatial reasoning of mothers depending on sex of offspring.

Nature of Any Difference					Postpubertal	
						Adult
Mothers of males better						**NORTH AMERICA** *Canada*: Vanston & Watson 2005 (scored better in spatial reasoning)
No signif. Difference						
Mothers of females better						

12.3
BEHAVIOR TOWARD OTHERS WITH REGARD TO THE OTHER'S SEX

The sex of the *recipient* of someone else's behavior (not the sex of the behaving individual) is the focus of attention in the following tables.

12.3.1. Parental-Offspring Interactions

Findings from studies of parent-offspring interactions depending on the sex of the offspring are the focus of the following section.

12.3.1.1. Parental Nurturing Behavior

Nurturing by parents can obviously take many forms, including the amount of time spent with offspring ensuring that their needs and wants are being satisfied. To measure nurturing, researchers usually employ direct observation by a trained observer, such as a child psychologist working in a day-care center.

As can be seen in Table 12.3.1.1, studies related to infants have generally found that male infants receive more attention, especially by the mother. This is true both in humans and in other primates. In the case of toddlers, the attention given by parents has been largely inconsistent with respect to any sex difference.

Table 12.3.1.1. Parental nurturing behavior.

Nature of Any Difference	Prepubertal	
	Infant	Toddler
Males more	**ASIA** *Bangladesh*: Lindenbaum 1977 **MIDDLE EAST** *India*: S Singh et al. 1962; BD Miller 1981 **NORTH AMERICA** *United States*: Moss 1967: 22 (time spent by mother stimulating or holding infant); Osofsky & Connors 1979 (mother's taking the initiative to interact with infant) **PRIMATE (EXCEPT APE)** *Baboon*: TE Rowell 1968 (mother's attentiveness to infant); Mori 1979 (mother's attentiveness to infant); *Bonnet Macaque*: Simonds 1974 (mother's attentiveness to infant); *Rhesus Macaque*: Breuggeman 1973 (mother's attentiveness to infant)	**ASIA** *Bangladesh*: D'Souza & Chen 1980; Bairagi 1986 (during a famine); *India*: Kielman & Taylor 1983:148 **EUROPE** *Germany*: Keller & Zach 2002* (time spent by father) **MIDDLE EAST** *Israel*: Gewirtz & Gewirtz 1968 (time spent by father) **NORTH AMERICA** *United States*: Rebelsky & Hanks 1971 (vocalization with toddler); Lamb 1977 (vocalization with toddler) **PRIMATE (EXCEPT APE)** *Rhesus Macaque*: GD Mitchell 1968 (play with the mother)
No signif. difference	**NORTH AMERICA** *United States*: MR Gunnar & Donahue 1980 (6, 9, & 12 months olds, responsiveness of mother)	
Females more		**EUROPE** *Germany*: Keller & Zach 2002* (time spent by mother) **NORTH AMERICA** *United States*: Moss 1967 (vocalization with toddler); S Goldberg & Lewis 1969 (vocalization with toddler); EB Thoman et al. 1972 (vocalization with toddler)

12.3.1.2. Being Breast Fed

Studies undertaken to determine if male or female offspring are breast fed more or for a greater length of time have considered a variety of species. Among nonhuman species, the available research has indicated that males are breast fed more than females. Human studies are much less consistent in indicating that male infants are breast fed more (or more often) than female infants (Table 12.3.1.2).

Table 12.3.1.2. Being breast fed.

Nature of Any Difference	Citation
Male offspring fed more	**AFRICA** *Egypt*: Makinson 1986 **EUROPE** *Britain*: Power & Matthews 1997 (only slight difference, mainly in the upper classes) **MIDDLE EAST** *Jordan*: Deeb 1987 (low income urban neighborhood) **NORTH AMERICA** *United States*: Thoman et al. 1972 **UNGULATE** *Deer*: Clutton-Brock et al. 1981 (mothers allow young juveniles to suckle); *Goat*: Pickering 1983 (mothers allow young juveniles to suckle) **RODENT** *Gerbil*: MM Clark et al. 1990
No signif. difference	**ASIA** *India*: Premrajan & Srinivasan 1991; *Vietnam*: IE Swenson 1993; National Committee for Population and Family Planning 1999 **AFRICA** *Egypt*: Nasser et al. 1988 **EUROPE** *Italy*: Faldella et al. 1999:24 (extent of breast feeding) **MIDDLE EAST** *Jordan*: Jain & Bongaarts 1981; Akin et al. 1986; Rutstein 1984
Female offspring fed more	**EUROPE** *Britain*: S Scott & Duncan 1999

12.3.1.3. Receiving Nutrition (Other Than Breast Milk)

With one exception, several studies have indicated that parents are more likely to provide more food or superior nutrition (aside from nutrition via breast feeding) to sons than to daughters (Table 12.3.1.3).

Table 12.3.1.3. Receiving nutrition (other than breast milk).

Nature of Any Difference	Prepubertal					
	Infant	Toddler	Early Childhood	Childhood		
Male offspring receive more	**ASIA** *Bangladesh*: D'Souza & Chen 1980; Chen et al. 1981 (diligent parental care); Bairagi 1986 (during a famine); *India*: Kielman & Taylor 1983:148 **LATIN AMERICA** *Mexico*: KG Dewey 1983 (diligent parental care)	**AFRICA** *Egypt*: Makinson 1986; SD Lane 1992 (rural) **ASIA** *India*: Behrman 1988		**ASIA** *Bangladesh*: L Chen et al. 1981 (rural); Bairagi 1986 (during a famine); *India*: Sen & Sengupta 1983; Das Gupta 1987 (Punjab province); *Tibet*: N Levine 1987 **APE** *Chimpanzee*: AE Pasey 1983 (by mothers, post weaning)		
No signif. difference						
Female offspring receive more			**AFRICA** *South Africa*: Quinn et al. 1995; Madise & Mpoma 1997 (Malawi tribe)			

12.3.1.4. Health Care Given to Offspring

According to most studies summarized in Table 12.3.1.4, in at least some countries, parents are more prone to seek medical care for their male offspring than for their female offspring.

Table 12.3.1.4. Health care given to offspring.

Nature of Any Difference	Prepubertal					
	Infant	Toddler	Early Childhood	Childhood		
Male offspring receive more	**ASIA** *Bangladesh*: Chen et al. 1981 (diligent parental care) **LATIN AMERICA** *Mexico*: KG Dewey 1983 (diligent parental care)	**AFRICA** *Egypt*: Yount 2003a; Yount 2003b	**AFRICA** *Egypt*: Lane & Meleis 1991 (physician or private clinic versus home or public clinic); SD Lane 1992 (physician or private clinic versus home or public clinic)	**AFRICA** *Egypt*: Tekce 1990; El-Mougi et al. 1991; Morsy 1993 **ASIA** *India*: Wyon & Gordon 1971; Kynch & Sen 1983		
No signif. difference				**ASIA** *Vietnam*: General Statistical Office 2000 (vaccination)		
Female offspring receive more						

12.3.1.5. Gender Given the Greatest Social Attention by Parents

Limited research surrounding the gender given the greatest social attention by parents has reached somewhat inconsistent conclusions (Table 12.3.1.5). This may be due to the specific nature of the social attention.

Table 12.3.1.5. Gender given the greatest social attention by parents.

Nature of Any Difference	Prepubertal
	Infant
Males more	**NORTH AMERICA** *United States*: RJ Tasch 1952 (rough and tumble play with father); Thoman et al. 1972* (physical stimulation by mother)
No signif. difference	
Females more	**NORTH AMERICA** *United States*: Thoman et al. 1972* (verbal stimulation by mother)

12.3.1.6. Parental Expectations Depending on the Sex of the Offspring

The one available study of parental expectations of their offspring revealed no significant difference regarding whether daughters or sons would grow up exhibiting greater computer skills (Table 12.3.1.6).

Table 12.3.1.6. Parental expectations depending on the sex of the offspring.

Nature of Any Difference	Multiple Age Category
Males more	
No signif. difference	**EUROPE** *Germany*: Dickhauser & Stiensmeier-Pelster 2003 (regarding computer skills)
Females more	

12.3.1.7. Inspection and Licking of the Anal-Genital Area

Studies of both primates and rodents have concluded that mothers were more likely to inspect or lick the genital region of her male pups than the same region of female pups. However, when the odor of the pups was experimentally masked in one study of rats, the sex difference disappeared (Table 12.3.1.7).

Table 12.3.1.7. Inspection and licking of the anal-genital area.

Nature of Any Difference	Prepubertal
	Infant
Males more	**MUSTELID** *Ferret*: MJ Baum et al. 1996 **PRIMATE (EXCEPT APE)** *Bonnet Macaque*: Simonds 1974 (mothers inspect the genitals); *Rhesus Macaque*: A Tartabini 1991 (captivity, by mothers) **RODENT** *Rat*: CL Moore & Morelli 1979 (mothers lick the anogenital region); CL Moore 1981 (mothers lick the anogenital region); CL Moore 1982* (by mothers under control conditions)
No signif. difference	**RODENT** *Rat*: CL Moore 1982* (by mother when scent was masked)
Females more	

12.3.1.8. Play With Offspring

Unlike most other animals, mammals love to play. A few studies have sought to determine if adults play more with male than with female offspring. Table 12.3.1.8 suggests that the findings have been mixed.

Table 12.3.1.8. Play with offspring.

Nature of Any Difference	Adolescent or Adult
	Adult
Males receive more	**NORTH AMERICA** *United States*: Tasch 1952 (rough & tumble play) **PRIMATE (EXCEPT APE)** *Rhesus Macaque*: Tartabini 1991 (captivity, by mother)
No signif. difference	
Females receive more	**APE** *Chimpanzee*: V Reynolds & Reynolds 1965 (wild population)

12.3.1.9. Controlling/Disciplining Behavior Toward Offspring

The degree to which adults (usually parents) attempt to control and discipline youngsters (usually offspring) short of imposing significant physical pain has been investigated by several studies. In general, at least among humans, fathers tend to be more likely to impose control and discipline in the case of sons, while mothers are more likely to do so in the case of daughters (Table 12.3.1.9).

Table 12.3.1.9. Controlling/disciplining behavior toward offspring.

Nature of Any Difference	Prepubertal		Postpubertal
	Early Childhood	Childhood	Adolescent
Male offspring receive more controlling/ disciplinary actions	**NORTH AMERICA** *United States*: Sears et al. 1957 (parent report)	**ASIA** *China*: Berndt et al. 1993 (young, controlling behavior by father) **NORTH AMERICA** *United States*: Wauchope & Straus 1990 (physically punished); RD Day et al. 1998 (physically punished) **PRIMATE (EXCEPT APE)** *Pigtail Macaque*: GD Jensen 1966 (disciplined by mother's biting)	**NORTH AMERICA** *United States*: Bronfenbrenner 1961* (discipline by father); M Siegal 1987 (controlling behavior by father); WA Collins & Russell 1991 (controlling behavior by father); SA Hill & Sprague 1999:496 (emphasizing obedient behavior)
No signif. difference			
Female offspring receive more controlling/ disciplinary actions	**NORTH AMERICA** *United States*: Kagan & Freeman 1970:511	**EUROPE** *Sweden*: Brembeck 1992 (mothers stricter with daughters than sons) **NORTH AMERICA** *United States*: Morrongiello & Dawber 2000 (mother's behavior toward risky playground behavior)	**NORTH AMERICA** *United States*: Bronfenbrenner 1961* (discipline by mother)

12.3.1.10. Physical Punishment by Parents or Adult Guardians

Table 12.3.1.10 summarizes findings regarding which gender of offspring is most likely to be physically punished by one or both parents. These studies suggest that for various species of macaque monkeys, females are punished more than males, at least in early childhood. For humans, however, the majority of studies have revealed that boys are punished more often than girls by parents.

Table 12.3.1.10. Physical punishment by parents or adult guardians.

Nature of Any Difference	Prepubertal (Age of Individual Punished)			Postpubertal
	Toddler	Early Childhood	Childhood	Adolescent
Males punished more	**NORTH AMERICA** *United States*: Smetana 1990 **PRIMATE (EXCEPT APE)** *Pigtail Macaques*: GD Jensen et al. 1967 (punitiveness by mother); G Mitchell & Brandt 1970	**NORTH AMERICA** *United States*: Sears et al. 1957 (parent report); JH Block 1976a (parents)	**ASIA** *Korea*: Chun 1989 **LATIN AMERICA** *Puerto Rico*: Landy 1959 **NORTH AMERICA** *United States*: White House Conference 1936* (spanked); Tasch 1952 (by father); Margolin & Patterson 1975; E Cummings et al. 1994b (physically beaten or injured by parents); Knutson 1995 (physically abused or injured by parents); Webster-Stratton 1996 (by mothers, conduct disorder); MA Straus et al. 1997:766 (both parents); Deater-Deckard et al. 1998 (by mothers for disobedience)	**NORTH AMERICA** *United States*: Droppleman & Schaefer 1963 (by parents, self reports); Crittenden et al. 1994 (early adolescent, physically punished or injured by parents)
No signif. difference	**NORTH AMERICA** *United States*: Koblinsky et al. 1997 (low income Black mothers)	**NORTH AMERICA** *United States*: White House Conference 1936*		
Females punished more	**PRIMATE (EXCEPT APE)** *Bonnet Macaque*: Silk et al. 1981; *Japanese Macaque*: Eaton et al. 1985; Eaton et al. 1986; *Toque Macaque*: Dittus 1977	**NORTH AMERICA** *United States*: Kagan & Freeman 1970:511		

12.3.1.11. Parental/Caregiver Encouragement of Children

One study compared the treatment of children by caregivers and found sex differences. Baby boys were more likely to be encouraged to rough-and-tumble play while baby girls were encouraged to play more with dolls (Table 12.3.1.11).

Table 12.3.1.11. Parental/caregiver encouragement of children.

Nature of Any Difference	Prepubertal
	Infant
Males receive more	**NORTH AMERICA** *United States*: JH Block 1976* (regarding rough and tumble play, by female caregiver)
No signif. difference	
Females receive more	**NORTH AMERICA** *United States*: JH Block 1976* (regarding play with dolls, by female caregiver)

12.3.1.12. Parental Influence on Dating and Mating Decision Making

Studies that have sought to determine if parents influence the dating and mating behavior of one sex more than that of the other have all concluded that they do so more for daughters than for sons (Table 12.3.1.12).

Table 12.3.1.12. Parental influence on dating and mating decision making.

Nature of Any Difference	Postpubertal
	Adolescent
Males influenced more	
No signif. difference	
Females influenced more	**NORTH AMERICA** *United States*: Moss & Robson 1968 (dating); JE Brown & Mann 1990; C Flanagan 1990; Holmbeck & O'Donnell 1991; Fuligni & Eccles 1993 (young); JE Jacobs et al. 1993 (young)

12.3.1.13. Supervision by Parents According to the Offspring's Sex

Research concerning the extent to which parents supervise male and female children usually relies on self-reports of parents or direct observations of parents in a laboratory situation. As one can see in Table 12.3.1.13, these studies have all indicated that female offspring are supervised more intensely than are male offspring.

Table 12.3.1.13. Supervision by parents according to the offspring's sex.

Nature of Any Difference	Prepubertal		Postpubertal
	Toddler	Childhood	Adolescent
Males were supervised more			
No signif. difference			
Females were supervised more	**NORTH AMERICA** *Canada*: Morrongiello & Dawber 1999; *United States*: Fagot 1974; Fagot 1978	**NORTH AMERICA** *United States*: J Clausen 1968; Newson & Newson 1976; Saegert & Hart 1976; JH Block 1983; Brody 1993	**EUROPE** *Sweden*: R Svensson 2003 **NORTH AMERICA** *United States*: Olver et al. 1989; JE Kim et al. 1999

12.3.1.14. Mother's Retrieval of Offspring According to the Offspring's Sex

A study was undertaken among Japanese macaques to determine if mothers were more likely to retrieve male or female offspring who had strayed from her immediate vicinity. This study concluded that among offspring, who were equivalent to human preschoolers, mothers were more likely to retrieve female offspring, but that for older sub-adolescents, there were no significant differences (Table 12.3.1.14).

Table 12.3.1.14. Mother's retrieval of offspring according to offspring's sex.

Nature of Any Difference	Prepubertal	
	Early Childhood	Childhood
Males retrieved more	**PRIMATE (EXCEPT APE)** *Japanese Macaque*: Eaton et al. 1985*	
No signif. difference		**PRIMATE (EXCEPT APE)** *Japanese Macaque*: Eaton et al. 1985*
Females retrieved more		

12.3.1.15. Gender Given Freedom by Parents in Choosing an Occupation

In a study undertaken to determine if males or females were given greater freedom in choosing an occupation, males were found to be given such freedom more than females in samples from all three countries investigated (Table 12.3.1.15).

Table 12.3.1.15. Gender given freedom by parents in choosing an occupation.

Nature of Any Difference	Citation
Males given more	**ASIA** *Japan*: RJ Smith et al. 1963*; *Philippines*: RJ Smith 1963* **NORTH AMERICA** *United States*: RJ Smith 1963*
No signif. difference	
Females given more	

12.3.1.16. Artifacts Given to Others According to Their Sex

One study of the types of gifts given to offspring according to their sex indicated that sons and daughters were generally given much different types of gifts (Table 12.3.1.16).

Table 12.3.1.16. Artifacts given to others according to their sex.

Nature of Any Difference	Prepubertal
	Infant
Males given more	**NORTH AMERICA** *Canada*: Pomerleau et al. 1990* (sports equipment, tools & vehicles, by parents)
No signif. difference	
Females given more	**NORTH AMERICA** *Canada*: Pomerleau et al. 1990* (dolls & furniture, by parents)

12.3.1.17. Time Spent With Offspring According to Offspring's Sex

According to one study, fathers spent more time with their sons than they did with their daughters (Table 12.3.1.17).

Table 12.3.1.17. Time spent with offspring according to offspring's sex.

Nature of Any Difference	Postpubertal
	Adult
Males receive more	**NORTH AMERICA** *United States*: Crouter & Crowley 1990 (by fathers)
No signif. difference	
Females receive more	

12.3.2. Parent-Offspring Discussions According to the Sex of the Offspring

Quite a number of studies have sought to determine if parents engage in discussions more with sons or with daughters. Most of these studies are based on reports by parents or on retrospective accounts of the offspring at an older age than when the discussion occurred.

12.3.2.1. Vocalizing With Offspring in General

A few studies have concluded that one or both parents spend more time talking to their female offspring than to their male offspring (Table 12.3.2.1).

Table 12.3.2.1. Vocalizing with offspring in general.

Nature of Any Difference	Prepubertal	
	Infant	Early Childhood
More with males (sons)		
No signif. difference		
More with females (daughters)	**NORTH AMERICA** *United States*: Tauber 1979 (by mothers); Power 1981	**NORTH AMERICA** *United States*: Reese et al. 1996 (reminiscing)

12.3.2.2. Tenor of Parent-Offspring Discussions According to the Offspring's Sex

The tenor of a discussion refers to its overall positive (friendlessness) vs. negative (sternness) nature. As shown in Table 12.3.2.2, these studies have concluded that verbal interactions with young daughters tend to be more friendly/less stern than those with young sons.

Table 12.3.2.2. Tenor of parent-offspring discussions according to the offspring's sex.

Nature of Any Difference	Prepubertal	
	Infant	Toddler
Discussions more friendly/less stern with males (sons)		
No signif. difference		
Discussions more friendly/less stern with females (daughters)	**NORTH AMERICA** *United States*: RP Klein & Durfee 1978 (more positive/friendly communication)	**NORTH AMERICA** *United States*: Cherry & Lewis 1976 (mothers verbally interacted more with daughters than with sons); Malatesta et al. 1989 (mother expressed more positive affect to daughters than to sons); Parnell 1992 (mother expressed more positive affect to daughters than sons)

12.3.2.3. Parent-Offspring Discussions of Emotions According to the Offspring's Sex

Research surrounding parental communication with their young offspring concerning emotions has provided somewhat mixed findings with respect to any overall differences. More discussions of emotions occur between parents and daughters than between parents and sons. However, there appears to be a tendency for parents to discuss emotions such as anger more with male children and emotions such as sadness more with female children (Table 12.3.2.3).

Table 12.3.2.3. Parent-offspring discussions of emotions according to the offspring's sex.

Nature of Any Difference	Prepubertal		
	Toddler	Early Childhood	Childhood
Discussed more with males (sons)		**NORTH AMERICA** *United States*: Fivush 1989* (anger); Fivush 1991* (anger)	
No signif. Difference		**NORTH AMERICA** *United States*: J Dunn et al. 1991; Denham et al. 1994	
Discussed more with females (daughters)	**NORTH AMERICA** *United States*: JH Block 1979 (daughters were encouraged to be more emotionally expressive by parents); J Dunn et al. 1987 (with mothers); Fivush 1989 (with mothers); Malatesta et al. 1989 (positive emotional feelings from mothers); Zahn-Waxler et al. 1993 (with mothers); Reese et al. 1996 (with both parents)	**NORTH AMERICA** *United States*: Barnett et al. 1980 (with mothers); J Dunn et al. 1987 (mother-offspring discussions of emotions); Zahn-Waxler et al. 1993 (mother-offspring discussions of emotions)	**NORTH AMERICA** *United States*: J Dunn et al. 1987; Fivush 1989* (sadness); Fivush 1991* (sadness); S Adams et al. 1995; Kuebli et al. 1995; Fuchs & Thelen 1988; Fivush 1989 (mother-offspring discussions of emotions); Kuebli & Fwush 1992; Flannagan & Perese 1998 (by mothers); Fivush et al. 2000 (mother-offspring discussions of negative emotions); Garside & Klimes-Dougan 2002 (father-offspring discussions of sadness); Garside & Klimes-Dougan 2002:124 (parents tolerate/encourage expression of sad emotions)

12.3.2.4. Parent-Offspring Discussions of Sexual Morality According to the Offspring's Sex

Table 12.3.2.4 indicates that discussions of sexual morality are greater with daughters, especially by the mother, than in the case of sons.

Table 12.3.2.4. Parent-offspring discussions of sexual morality according to the offspring's sex.

Nature of Any Difference	Prepubertal					
				Childhood	Adolescent	
Discused more with males (sons)						
No signif. difference						
Discussed more with females (daughters)				**NORTH AMERICA** *United States*: Nolin & Petersen 1992 (sexual morality, esp. mothers)	**NORTH AMERICA** *United States*: DeLamater 1989 (sexual morality, esp. mothers); du Bois-Raymond & Ravesloot 1996 (sexual morality, esp. mothers); Lefkowitz et al. 2002:230 (mother-offspring discussion of sex) **EUROPE** *Sweden*: Haggstrom-Nordan et al. 2002: 291	

12.3.3. Other Parent-Offspring Factors

A variety of parent-offspring factors are considered below with respect to possible sex differences.

12.3.3.1. Names Given to Offspring, Variety of

One study investigated patterns in the naming of children and found that parents were more likely to give a greater variety of names to their daughters than to their sons (Table 12.3.3.1).

Table 12.3.3.1. Names given to offspring, variety of.

Nature of Any Difference	Citations
Male names more unusual	
No signif. difference	
Female names more unusual	**NORTH AMERICA** *United States*: T Anderson 1985

12.3.3.2. Resemblance to One's Mother in Dominance Rank

A couple of animal studies have been undertaken to determine if males or females are more likely to resemble their mothers with respect to dominance rank. Both studies indicated that female offspring are more similar in dominance rank to their mothers than are male offspring (Table 12.3.3.2).

Table 12.3.3.2. Resemblance to one's mother in dominance rank.

Nature of Any Difference				Postpubertal		
				Adolescent	Adult	
Males more similar						
No signif. difference						
Females more similar				**PRIMATE (EXCEPT APE)** *Macaque*: Kawai 1958	**PRIMATE (EXCEPT APE)** *Macaque*: Hausfater et al. 1982	

12.3.3.3. Offspring's Identification With Parents

According to Table 12.3.3.3, both male and female offspring are more likely to report modeling their behavior after their same-sex parent than after their opposite-sex parent.

Table 12.3.3.3. Offspring's identification with parents.

Nature of Any Difference					Postpubertal	
					Adult	
Offspring use same-sex parent as main role model					**NORTH AMERICA** *United States*: Starrels 1994; AJ Walker 1999	
No signif. difference						
Offspring use opposite-sex parent as main role model						

12.3.3.4. Probability of Divorce According to Sex of Offspring

Three studies have concluded that parents of daughters were more likely to divorce than parents of sons. However, most studies have failed to reveal any significant differences in this regard (Table 12.3.3.4).

Table 12.3.3.4. Probability of divorce according to sex of offspring.

Nature of Any Difference						Multiple Age Categories
Parents with sons more likely to divorce						
No signif. difference						**EUROPE** *Switzerland*: Diekmann & Schmidheiny 2001 **OCEANIA** *Australia*: Bracher et al. 1993 **INTERNATIONAL** *Multiple Countries*: Diekmann & Schmidheiny 2004
Parents with daughters more likely to divorce						**ASIA** *India*: Bose & South 2003 **NORTH AMERICA** *United States*: P Glick 1988; SP Morgan et al. 1988

12.3.3.5. Response to the Death of a Parent

One study sought to determine if male or female infants were more likely to die following the death of their mothers. It concluded that there was no significant gender difference in this regard (Table 12.3.3.5).

Table 12.3.3.5. Response to the death of a parent.

Nature of Any Difference	Prepubertal					
	Infant					
Sons more likely						
No signif. difference	**LATIN AMERICA** *Paraguay*: K Hill & Hurtado 1996 (Ache tribe)					
Daughters more likely						

12.3.4. Behavior Based on the Gender of the Individual With Whom One Interacts

Sometimes both males and females exhibit different behavior depending not upon their own gender but upon the gender of those with whom they are socially interacting. The results of research that has assessed these behavioral patterns are reviewed below.

12.3.4.1. Communication Behavior According to the Recipient's Gender

An investigation into vocalizations by zebra finches concluded that males vocalized more in the presence of females than in the presence of other males. Females, on the other hand, did not discriminate. The limited research on primates (including humans) suggests that animals of both sexes communicate more with females than they do with males (Table 12.3.4.1).

Table 12.3.4.1. Communication behavior according to the recipient's gender.

Nature of Any Difference	Prepubertal				Postpubertal	
		Toddler			Adult	
Vocalize more to opposite sex					**BIRD** *Zebra Finch*: Vicario et al. 2001* (during courtship)	
No signif. difference					**BIRD** *Zebra Finch*: Vicario et al. 2001* (females call to both sexes equally)	
Vocalize more to same sex		**NORTH AMERICA** *United States*: LJ Harris 1977 (by mothers to offspring)			**PRIMATE (EXCEPT APE)** *Ringtail Lemur*: SB Christopher & Gelini 1977 (jaw thrusting behavior)	

12.3.4.2. Emotional Feelings Toward Others Based on Their Sex

According to a couple of studies, women have stronger feelings toward males than toward females, at least in the case of feelings of fear and anger (Table 12.3.4.2).

Table 12.3.4.2. Emotional feelings toward others based on their sex.

Nature of Any Difference	Postpubertal
	Adult
Stronger toward men	**NORTH AMERICA** *United States*: Brody 1993 (among women, fearful feelings toward men); Brody et al. 1995 (among women, angry feelings toward men)
No signif. difference	
Stronger toward women	

12.3.4.3. Decoding Another's Facial Expressions Based on Their Sex

Most of the research on the ability to decode (correctly interpret) the facial expressions of another person gives the edge to females, especially following childhood (Table 12.3.4.3).

Table 12.3.4.3. Decoding another's facial expressions based on their sex.

Nature of Any Difference				Postpubertal
	Infant	Early Childhood	Childhood	Adult
Male expressions more accurately decoded				
No signif. difference	**NORTH AMERICA** *United States*: T Field 1982	**NORTH AMERICA** *United States*: Yarczower & Daruns 1982		
Female expressions more accurately decoded		**NORTH AMERICA** *United States*: R Buck 1977	**NORTH AMERICA** *United States*: R Buck 1975	**NORTH AMERICA** *United States*: R Buck et al. 1972; R. Buck et al. 1974; Fujita et al. 1980; Gallagher & Shuntich 1981

12.3.4.4. Imitating/Modeling According to the Recipient's Sex

Two studies of imitating behavior by children according to the recipient's sex concluded that boys and girls were equally prone to model adults of their own gender (Table 12.3.4.4).

Table 12.3.4.4. Imitating/modeling according to the recipient's sex.

Nature of Any Difference	Prepubertal
	Childhood
Males imitate more	
No signif. difference	**NORTH AMERICA** *United States*: JC Masters et al. 1979 (imitate adults of same sex); Perry & Bussey 1979 (imitate adults of same sex)
Females imitate more	

12.3.4.5. Skin Conductivity Responses to Others Based on Their Sex

Two studies have measured the conduction of tiny imperceptible amounts of electrical current throughout the body using the Galvanic skin response (GSR) meter. Both studies found that when people (of both sexes) were in the presence of males, they registered stronger GSR responses than when in the presence of females (Table 12.3.4.5).

Table 12.3.4.5. Skin conductivity responses to others based on their sex.

Nature of Any Difference	Multiple Age Categories
Response to males more intense	**NORTH AMERICA** *United States*: WL Donovan & Leavitt 1980; Mazurski et al. 1996
No signif. difference	
Response to females more intense	

12.3.4.6. Personal Space Given to Others Based on Their Sex

In a study of children interacting with one another, a researcher concluded that boys were given more personal space than were girls by girls as well as by boys (Table 12.3.4.6).

Table 12.3.4.6. Personal space given to others based on their sex.

Nature of Any Difference	Prepubertal	
	Early Childhood	Childhood
Males given more personal space	**MIDDLE EAST** *Israel*: Lomranz et al. 1975*	**MIDDLE EAST** *Israel*: Lomranz et al. 1975* (young)
No signif. difference		
Females given more personal space		

12.3.4.7. Reporting Inner Feelings to Others Based on Their Sex

As shown in Table 12.3.4.7, three studies concluded that for all emotions except anger both sexes are more likely to reveal their inner feelings to others when the recipient is female.

Table 12.3.4.7. Reporting inner feelings to others based on their sex.

Nature of Any Difference	Postpubertal
	Adult
Reporting to males more	
No signif. difference	
Reporting to females more	**NORTH AMERICA** *United States*: Aries 1976; Dosser et al. 1983 (all feelings except anger); Blier & Blier-Wilson 1989 (all feelings except anger)

12.3.4.8. Giving in to Tantrums Based on Gender

One study of children who threw tantrums when deprived of attention or of a desired object concluded that mothers of boys gave in more often than did mothers of girls (Table 12.3.4.8).

Table 12.3.4.8. Giving in to tantrums based on gender.

Nature of Any Difference	Prepubertal
	Early Childhood
Give in more to males	**NORTH AMERICA** *United States*: Radke-Yarrow & Kochanska 1990 (mother)
No signif. difference	
Give in more to females	

12.3.4.9. Neutering a Pet Based on the Animal's Sex

According to two studies, female pets are more likely to be neutered than are male pets (Table 12.3.4.9).

Table 12.3.4.9. Neutering a pet based on the animal's sex.

Nature of Any Difference	Multiple Age Categories
Males more	
No signif. difference	
Females more	**LATIN AMERICA** *Bahamas*: Fielding & Mather 2001 **OCEANIA** *Australia*: Blackshaw & Day 1994

12.3.5. Institutional Response to Others Based on Gender

Studies of how social institutions respond differently to males and females are reviewed in the present section. Most of the institutional responses are concerned with providing health care.

12.3.5.1. Medical Treatment Sought by Parents Based on Gender of Offspring

Studies undertaken to determine if parents discriminate in providing medical care for children depending on the child's gender have been conducted primarily in Africa and the Middle East. These studies have found that parents are more likely to take their sons for treatment than their daughters (Table 12.3.5.1). The extent to which this may reflect any gender differences in susceptibility to ill-health is virtually impossible to assess. In the case of adults, studies in the United States indicate that male patients who present with conditions that are similar to those of female patients receive higher levels of medical treatment.

Table 12.3.5.1. Medical treatment sought by parents based on gender of offspring.

Nature of Any Difference	Prepubertal				Postpubertal	
		Toddler	Early Childhood	Childhood		Adult
Males receive more		**MIDDLE EAST** *Egypt*: Yount 1999* (diarrhea)	**AFRICA** *Egypt*: Langsten & Hill 1995; *Morocco*: Arnold 1992	**AFRICA** *Egypt*: Yount 1999* (full vaccination); *Morroco*: Obermeyer & Cardenas 1997 (full vaccination) **INTERNATIONAL** *Several Developing Countries*: Timaeus et al. 1998 (full vaccination)		**NORTH AMERICA** *United States*: JN Katz et al. 1994 (arthritis patients); Riuz & Verbrugge 1997 (heart disease patients); American Heart Association 2001 (coronary artery bypass graph)
No signif. difference						
Females receive more						

12.3.5.2. Physicians Taking Symptoms of Ill Health Seriously According to the Sex of the Patient

Surveys of physicians have indicated that they are more likely to consider the complaints of ill health by male patients as being more of a cause for concern than the same complaints by female patients (Table 12.3.5.2).

Table 12.3.5.2. Physicians taking symptoms of ill health seriously according to the sex of the patient.

Nature of Any Difference	Postpubertal
	Adult
Males taken more seriously	**NORTH AMERICA** *United States*: Bronstein 1976; KJ Armitage et al. 1979; B Bernstein & Kane 1981; Colameco et al. 1983; JN Katz et al. 1994; Riuz & Verbrugge 1997
No signif. difference	
Females taken more seriously	

12.3.5.3. Receiving Experimental Medical Treatment

According to one study of persons with acute coronary symptoms, males were more likely than females to be offered an opportunity to participate in random trials for experimental treatment of the underlying disease.

Table 12.3.5.3. Receiving experimental medical treatment.

Nature of Any Difference	Postpubertal
	Adult
Males receive more	**NORTH AMERICA** *United States*: PY Lee et al. 2001 (random trials of acute coronary symptoms, elderly)
No signif. difference	
Females receive more	

12.3.5.4. Reports of Pain to Others Based on Their Sex

Do people report feeling more pain to a male or a female clinician? One study concluded that men reported feeling more pain to a female than a male, while there was no significant gender-of-clinician effect in the case of females (Table 12.3.5.4).

Table 12.3.5.4. Reports of pain to others based on their sex.

Nature of Any Difference	Postpubertal
	Adult
Reports to male investigators more	
No signif. difference	**NORTH AMERICA** *United States*: Levine & DeSimone 1991* (by females)
Reports to female investigators more	**NORTH AMERICA** *United States*: Levine & DeSimone 1991* (by males)

12.3.5.5. Assessment of Obesity in Males and Females

People generally have negative attitudes toward obesity, but are those attitudes stronger regarding an obese male or an obese female? Studies have reached inconsistent conclusions in this regard (Table 12.3.5.5).

Table 12.3.5.5. Assessment of obesity in males and females.

Nature of Any Difference					Postpubertal		
						Adult	
More negative toward males						**NORTH AMERICA** *United States*: Peck & Loken 2004 (college, picture appreciation task)	
No signif. effect							
More negative toward females						**NORTH AMERICA** *United States*: Tiggeman & Rothblum 1988* **OCEANIA** *Australia*: Tiggeman & Rothblum 1988*	

12.3.5.6. Time Spent Talking With a Patient by a Physician

One study indicated that female physicians spent more time talking to patients than did male physicians (Table 12.5.3.6).

Table 12.5.3.6. Time spent talking with a patient by a physician.

Nature of Any Difference					Postpubertal		
						Adult	
Greater for male physicians							
No signif. difference							
Greater for female physicians						**NORTH AMERICA** *United States*: Cooper-Patrick et al. 1999 (sex of patient made no difference)	

12.3.5.7. Treatment by Physicians or Receiving Medical Care in General

Studies have come to inconsistent conclusions regarding any gender difference in the tendency to receive medical treatment or physician attention for various diseases (Table 12.5.3.7).

Table 12.5.3.7. Treatment by physicians or receiving medical care in general.

Nature of Any Difference					Postpubertal		Multiple Age Categories
						Adult	
Males receive more						**EUROPE** *Britain*: Doyal et al. 2003 (research focused on men in US, Canada, Australia & S Africa) **MIDDLE EAST** *India*: Nirmalan et al. 2003 (surgery for cataract sufferers) **NORTH AMERICA** *United States*: IK Broverman et al. 1970; Mendelsohn 1981; Tobin et al. 1987 (heart disease patients)	**NORTH AMERICA** *United States*: KJ Armitage et al. 1979; B Bernstein & Kane 1981; Council on Ethical & Judicial Affairs 1991
No signif. difference							
Females receive more						**NORTH AMERICA** *United States*: PJ Bush & Osterweis 1978 (prescriptions); Mellinger & Balter 1981 (prescribed psychotropic medications); Verbrugge & Steiner 1981 (recommended follow up visits); Cafferata et al. 1983 (prescribed psychotropic medications); Rossiter 1983 (prescriptions); Svarstad 1983 (prescriptions); Verbrugge 1985:160 (prescriptions); Verbrugge 1985:161 (prescribed psychotropic medications)	

12.3.5.8. Surgical Treatment for Heart Disease

Numerous studies have investigated sex differences in the treatment of persons who have suffered a heart attack (myocardial infarction). Most of these studies have concluded that men are more likely than women to receive revascularization as well as other surgical treatments as part of their therapy (Table 12.5.3.8).

Table 12.5.3.8. Surgical treatment for heart disease.

Nature of Any Difference					Postpubertal
					Adult
Males receive more					**EUROPE** *Netherlands*: Roeters vanLennep 2000 **NORTH AMERICA** *Canada*: D'Hoore et al. 1994**;** Jagal et al. 1994; *United States*: Pashos & McNeil 1990 (elderly); Ayanian & Epstein 1991 (CHD patients); Steingart et al. 1991 (coronary artery bypass graft surgery); Bickell et al.1992 (elderly, revascularization); Maynard et al. 1992 (aggressive treatment); Krumholz et al. 1992; Udvarhelyi et al. 1992 (elderly, revascularization); Pashos et al. 1993 (revascularization); M Funk & Griffey 1994; Kostis et al. 1994 (elderly, revascularization); MR Bell et al. 1995; Giles et al. 1995 (elderly, revascularization); Bergelson & Tommaso 1996; C Maynard et al. 1996; Weintraub et al. 1996 (elderly, revascularization); Canto et al. 2000 (elderly, reperfusion therapy); BM Crawford et al. 2000; Gottlieb et al. 2000; Kilaru et al. 2000; RE Watson 2001; Rathore et al. 2003 (elderly, revascularization especially after bypass surgery)
No signif. Difference					**EUROPE** *Britain*: AK Sullivan et al. 1994 (revascularization) **NORTH AMERICA** *Canada*: Naylor & Levinton 1993 (revascularization); *United States*: DB Mark et al. 1994 (coronary angiography); Leape et al. 1999 (revascularization); Ghali et al. 2002 (revascularization)
Females receive more					

12.3.5.9. Treatment for Kidney Disease

According to one study, males are more likely than females to receive at least two types of treatment for kidney disease (Table 12.5.3.9).

Table 12.5.3.9. Treatment for kidney disease.

Nature of Any Difference					Postpubertal
					Adult
Males receive more					**NORTH AMERICA** *Canada*: DE Schaubel et al. 2000 (kidney transplant)
No signif. difference					
Females receive more					

12.4
TREATMENT AND PERCEPTION BY VOTERS

In the following tables, studies of are reviewed concerning how political candidates are treated and perceived by voters according to the sex of the candidates.

12.4.1. Treatment by Voters

Sex differences in whether or not a candidate for an elected office is elected and how they are treated when elected are examined below.

12.4.1.1. Winning Elections/Being Elected

The available studies on whether men or women candidates are most likely to win an election have concluded either that there were no significant differences or that males have a higher probability of winning (Table 12.4.1.1).

Table 12.4.1.1. Winning elections/being elected.

Nature of Any Difference					Postpubertal
					Adult
Males more					**NORTH AMERICA** *United States*: Westlye 1991; Drasno 1994; Herrick 1996; Kropf & Boiney 2001
No signif. difference					**NORTH AMERICA** *United States*: RS Darcy et al. 1994 (national offices); RL Fox 2000 (national offices)
Females more					

12.4.1.2. Asked to Perform Governmental Casework Interventions

A limited amount of research has indicated that female legislators receive more requests from their constituents to perform casework interventions on their constituents' behalf than do male legislators (Table 12.4.1.2.).

Table 12.4.1.2. Asked to perform governmental casework interventions.

Nature of Any Difference					Postpubertal	
						Adult
Males asked more						
No signif. difference						
Females asked more						**NORTH AMERICA** *United States*: Antolini 1984; LE Richardson & Freeman 1995

12.4.2. Voters' Perceptions of Candidates & Elected Officials

Sex differences in how candidates and elected officials are perceived are the subject of the following brief section.

12.4.2.1. Perceived as Compassionate

According to two studies, female political candidates were thought by the citizenry to be more compassionate than were male candidates (Table 12.4.2.1).

Table 12.4.2.1. Perceived as compassionate.

Nature of Any Difference					Postpubertal	
						Adult
Males perceived as more						
No signif. difference						
Females perceived as more						**NORTH AMERICA** *United States*: Leeper 1991; Huddy & Terkildsen 1993a

12.4.2.2. Perceived as Better Able to Deal With Compassionate Issues

In the present context, compassion issues have to do with those of welfare, education, race relations, and health. The available studies have concluded that female political candidates are thought to be on average better able to deal with these types of issues when compared to their male counterparts (Table 12.4.2.2).

Table 12.4.2.2. Perceived as better able to deal with compassionate issues.

Nature of Any Difference					Postpubertal	
						Adult
Males more						
No signif. difference						
Females more						**EUROPE** *Norway*: Matland 1994 **NORTH AMERICA** *United States*: Huddy & Terkildsen 1993a; Huddy & Terkildsen 1993b

12.4.2.3. Perceived as More Competent at Economic and Military/Foreign Affairs

The available research on how male or female political candidates are perceived regarding the ability to deal with economic and military or foreign affairs have concluded that males are perceived as more capable than females by most voters (Table 12.4.2.3).

Table 12.4.2.3. Perceived as more competent at economic and military/foreign affairs.

Nature of Any Difference					Postpubertal	
						Adult
Males perceived as more						**EUROPE** *Norway*: Matland 1994 **NORTH AMERICA** *United States*: Huddy & Terkildsen 1993a; Huddy & Terkildsen 1993b
No signif. difference						
Females perceived as more						

12.4.2.4. Perceived as More Liberal

Several studies have concluded that female political candidates (or elected officials) are thought to be more liberal than their corresponding male candidates (or elected officials) (Table 12.4.2.4).

Table 12.4.2.4. Perceived as more liberal.

Nature of Any Difference					Postpubertal	
						Adult
Males perceived as more						
No signif. difference						
Females perceived as more						**NORTH AMERICA** *United States*: D Alexander & Andersen 1993; McDermott 1997; McDermott 1998; Koch 2000

12.5

SOCIAL TREATMENT BY OTHERS

A wide array of studies has examined how males and females differ with respect to the treatment they receive from others. Findings are reviewed below.

12.5.1. Treatment by Social Interactants in General

Several fairly general types of social treatments by others according to the sex of the recipient are reviewed in the following tables.

12.5.1.1. Mentoring

The one study found on mentoring concluded that male manager trainees were more intensely mentored by established managers than were female manager trainees (Table 12.5.1.1).

Table 12.5.1.1. Mentoring.

Nature of Any Difference					Postpubertal	
						Adult
Male receive more						**NORTH AMERICA** *United States*: Ragins & Cotton 1991 (managers)
No signif. difference						
Female receive more						

12.5.1.2. Being Helped and Supported by Others

With the exception of helping with a small favor (such as telling the time of day), all of the available research has concluded that people are more likely to help females than they are to help males (Table 12.5.1.2).

Table 12.5.1.2. Being helped and supported by others.

Nature of Any Difference					Postpubertal	
					Adolescent	Adult
Males helped more						**NORTH AMERICA** *United States*: Emswiller et al. 19714 (small favor)
No signif. difference						
Females helped more					**NORTH AMERICA** *Canada*: RJ Burke & Weir 1978; *United States*: Solomon & Herman 1977*; Brigham & Richardson 1979*; Juni & Roth 1981*; Gentile et al. 1986*; Mallozzi et al 1990*	**NORTH AMERICA** *United States*: WE Simon 1971; Latane & Dabbs 1975 (contrived accident victims); Solomon & Herman 1977*; Brigham & Richardson 1979*; Juni & Roth 1981*; Gentile et al. 1986*; Mallozzi et al 1990*

12.5.1.3. Being Waited on in a Store

Two studies of customers in general retail stores concluded that males receive attention from the sales staff earlier than did females (Table 12.5.1.3).

Table 12.5.1.3. Being waited on in a store.

Nature of Any Difference							Multiple Age Categories
Males receive customer attention sooner							**NORTH AMERICA** *United States*: Zinkhan & Stoiadin 1984; Stead & Zinkhan 1986
No signif. difference							
Females receive customer attention sooner							

12.5.1.4. Being Arrested (Offense Controlled)

A few studies have sought to determine if a sex difference exists in treatment by the criminal justice system. As shown in Table 12.5.1.4, relative to females, males seem to be more often arrested when suspected of the same basic offenses.

Table 12.5.1.4. Being arrested (offense controlled).

Nature of Any Difference							Multiple Age Groups
Males arrested more							**NORTH AMERICA** *United States*: Lundman 1974 (adolescent & adult); DA Smith & Visher 1981 (adolescent & adult); Stolzenberg & D'Alessio 2004 (adolescent & adult)
No signif. difference							
Females arrested more							

12.5.1.5. Treatment by Court System

According to one study, males receive more severe punishment by simulated juries for identical offenses than was true for females (Table 12.5.1.5).

Table 12.5.1.5. Treatment by court system.

Nature of Any Difference					Postpubertal		
						Adult	
Males judged more harshly more						**OCEANIA** *Australia*: Forsterlee et al. 2004 (given more severe punishment by simulated juries)	
No signif. difference							
Females judged more harshly							

12.5.1.6. Being Addressed by First Name

One study in a work environment found that females were more likely than males to be called by their first rather than by their last name (Table 12.5.1.6).

Table 12.5.1.6. Being addressed by first name.

Nature of Any Difference							Multiple Age Categories
Males receive more							
No signif. difference							
Females receive more							**NORTH AMERICA** *United States*: Lakoff 1973 (in the workplace)

12.5.1.7. Treatment/Judgment of Sexual Harassment Perpetrators

According to one study, males who engaged in sexual harassment were judged more harshly than were females who engaged in the same harassing acts (Table 12.5.1.7).

Table 12.5.1.7. Treatment/judgment of sexual harassment perpetrators.

Nature of Any Dif-ference					Postpubertal		
						Adult	
Males judged more harshly						**NORTH AMERICA** *United States*: LaRocca & Kromrey 1999 (college)	
No signif. difference							
Females judged more harshly							

12.5.1.8. Laughter in the Presence of Others

A study of the laughter of children concluded that laughter was greater in the presence of adult males than in the presence of adult females (Table 12.5.1.8).

Table 12.5.1.8. Laughter in the presence of others.

Nature of Any Difference	Prepubertal					
				Childhood		
Males more				**NORTH AMERICA** *United States*: HC Foot & Chapman 1976 (school-age)		
No signif. difference						
Females more						

12.5.1.9. Nicknaming

One study concluded that males are more likely than females to have nicknames that reflect some unusual physical feature (e.g., “shorty”, “red”) (Table 12.5.1.9.).

Table 12.5.1.9. Nicknaming.

Nature of Any Difference	Prepubertal					
				Childhood		
Males more				**NORTH AMERICA** *United States*: Orgel & Tuchman 1935 (Jewish orphanage, reflecting unusual physical feature)		
No signif. difference						
Females more						

12.5.1.10. Pressure to Quit Smoking

According to the one relevant study located, female smokers are pressured to quit to a greater degree than are male smokers (Table 12.5.1.10).

Table 12.5.1.10. Pressure to quit smoking.

Nature of Any Difference					Postpubertal		
						Adult	
Males more							
No signif. difference							
Females more						**NORTH AMERICA** *United States*: Royce et al. 1997	

12.5.1.11. Time Spent Conversing With Others Depending on Their Sex

Most studies of the time spent conversing have concluded that females receive more verbal conversational time than do males, at least by mothers. The exceptional study indicated that children have more negative conversations with male peers than with female peers (Table 12.5.1.11).

Table 12.5.1.11. Time spent conversing with others depending on their sex.

Nature of Any Difference	Prepubertal				Postpubertal		
			Early Childhood			Adult	
Males more			**NORTH AMERICA** *United States*: Pitcher & Schultz 1983:25 (negative contacts)				
No signif. difference							
Females more						**EUROPE** *Britain*: J Dunn et al. 1987 (mother talks to their toddlers) **NORTH AMERICA** *United States*: JR Brown et al. 1996 (mother talks to child daughter); Cervantes & Callanan 1998 (mother talks to toddler daughter)	

12.5.2. Treatment by Parents

In a number of respects, parents have been found to treat their daughters and their sons differently. The findings in this regard are presented in the following tables.

12.5.2.1. Parent-Offspring Social Interaction in General Based on the Sex of the Offspring

Most studies have concluded that female infants receive more (and more friendly) attention than do male infants (Table 12.5.2.1).

Table 12.5.2.1. Parent-offspring social interaction in general based on the sex of the offspring.

Nature of Any Difference	Prepubertal	
	Infant	Toddler
Male infants receive more	**PRIMATE (EXCEPT APE)** *Macaque*: GD Jensen et al. 1968* (1-4 weeks old, held by mothers)	
No signif. difference		
Female infants receive more	**NORTH AMERICA** *United States*: Malatesta et al. 1989 (friendly facial expressions toward infants by mothers); Parnell 1991 (mothers smile with daughters more) **PRIMATE (EXCEPT APE)** *Macaque*: GD Jensen et al. 1968* (5 weeks and older, held by mothers)	**NORTH AMERICA** *United States*: Fagot 1974 (praise & criticism); Cherry & Lewis 1976 (talking) **PRIMATE (EXCEPT APE)** *Japanese Macaque*: GG Eaton et al. 1985:241 (maintain contact)

12.5.2.2. Being Assigned Tasks/Chores by Parents Based on the Sex of the Offspring

One study indicated that females were more likely than males to be assigned household chores by their parents (Table 12.5.2.2).

Table 12.5.2.2. Being assigned tasks/chores by parents based on the sex of the offspring.

Nature of Any Difference	
	Adolescent
Males receive more	
No signif. difference	
Females receive more	**NORTH AMERICA** *Canada*: J Peters 1994 (household chores)

12.5.2.3. Parental Tolerance of Offspring Drinking

Based on interviews or questionnaires of either parents or the offspring, researchers have sought to determine if there are gender differences regarding parental permissiveness concerning the consumption of alcohol. Table 12.5.2.3 reveals that in all of these studies drinking is allowed or at least tolerated more by parents of sons than by parents of daughters.

Table 12.5.2.3. Parental tolerance of offspring drinking.

Nature of Any Difference	Postpubertal	Multiple Age Categories
	Adult	
Males more	**EUROPE** *Britain*: Otto 1981; C Schmidt et al. 1990 **NORTH AMERICA** *United States*: Gomberg & Nirenberg 1993	**NORTH AMERICA** *Canada*: Legge & Sherlock 1990-1991 (Indian-Pakistanis residing in Canada)
No signif. difference		
Females more		

12.5.2.4. Parental Pressure for Socioeconomic Achievement by Offspring

Most studies have concluded that parents place greater pressure on sons than on daughters to strive for socioeconomic status and occupational success (Table 12.4.5.4).

Table 12.5.2.4. Parental pressure for socioeconomic achievement by offspring.

Nature of Any Difference	Postpubertal	
	Adolescent	Adult
Males more	**NORTH AMERICA** *United States*: JC Flanagan et al. 1964; W Sewell & Shah 1968b; MM Marini 1974	
No signif. difference		**EUROPE** *Finland*: Raty 1999
Females more		

12.5.2.5. Investment in Offspring by Parents

The two studies of time and energy devoted by parents toward their offspring did not reached consistent conclusions with respect to any sex difference (Table 12.5.2.5).

Table 12.5.2.5. Investment in offspring by parents.

Nature of Any Difference	Childhood	Multiple Age Categories
Males more	**AFRICA** *Papua New Guinea*: J Gibson & Rozelle 2004 (distribution of assets)	
No signif. difference		
Females more		**EUROPE** *Hungary*: Bereczkei 1993; Bereczkei & Dunbar 1997 (Gypsies)

12.5.2.6. Protective and Retrieval Behavior by Parents

In various macaque species, primatologists have reported on gender differences in the tendency by adults (mainly mothers) to exhibit protective measures on behalf of youngsters (primarily offspring). As shown in Table 12.5.2.6, these studies have not come to consistent conclusions, although at least among infants, females seem to garner more protective efforts than do males.

Table 12.5.2.6. Protective and retrieval behavior by parents.

Nature of Any Difference	Prepubertal		
	Infant	Toddler	Childhood
Males more		**PRIMATE (EXCEPT APE)** *Japanese Macaque*: Eaton et al. 1985* (by mothers)	
No signif. difference			**PRIMATE (EXCEPT APE)** *Japanese Macaque*: Eaton et al. 1985* (by mothers)
Females more	**PRIMATE (EXCEPT APE)** *Pigtail Macaque*: GD Jensen et al. 1967 (by the mother); *Japanese Macaque*: Itani 1959 (by the mother); *Rhesus Macaques*: GD Mitchell 1968 (by the mother)		

12.5.2.7. Support Given to Offspring by Parents

According to the one study located, there is no sex difference in the extent to which offspring receive general psychological support from their parents (Table 12.5.2.7).

Table 12.5.2.7. Support given to offspring by parents.

Nature of Any Difference	Citation
Male offspring receive more	
No signif. difference	**EUROPE** *Britain*: Eiser et al. 1995:311 (given to young adolescent)
Female offspring receive more	

12.5.2.8. Parents Giving in to Offspring/Permissive Behavior

One study concluded that parents were more likely to yield to the temper tantrums of a boy than to those of a girl (Table 12.5.2.8).

Table 12.5.2.8. Parents giving in to offspring/permissive behavior.

Nature of Any Difference	Prepubertal
	Early Childhood
More often with males	**NORTH AMERICA** *United States*: Radke-Yarrow & Kochanska 1990 (preschool, mothers giving into tantrums)
No signif. difference	
More often with females	

12.5.2.9. Parental Tolerance of Hyperactive/Unruly Behavior by Offspring

Conflicting results have been obtained with regard to which sex's misbehavior is most likely to be tolerated by parents (Table 12.5.2.9).

Table 12.5.2.9. Parental tolerance of hyperactive/unruly behavior by offspring.

Nature of Any Difference	Prepubertal	
	Early Childhood	Childhood
Males more	**NORTH AMERICA** *United States*: RS Mills & Rubin 1992 (by mothers)	
No signif. difference		
Females more		**NORTH AMERICA** *United States*: Battle & Lacey 1972

12.5.2.10. Parental Encouragement of Offspring Academic Success

Most of the studies pertaining to the gender of the offspring who receives the greatest parental encouragement in terms of academic achievement have concluded that males receive more encouragement, although in one report, there was no significant difference specifically regarding mathematics (Table 12.5.2.10).

Table 12.5.2.10. Parental encouragement of offspring academic success.

Nature of Any Difference	Postpubertal
	Adolescent
Greater for males	**EUROPE** *Austria*: Schober et al. 2004 (among gifted students) **NORTH AMERICA** *United States*: JC Flanagan et al. 1964; Sewell & Shah 1968b; Marini 1974
No signif. difference	**NORTH AMERICA** *United States*: RB Felson & Trudeau 1991 (math)
Greater for females	

12.5.2.11. Parental Encouragement of Offspring Independence

Among humans, two studies involving human subjects sought to determine if boys or girls received more encouragement by their parents with regard to being independent. They concluded that, on average, boys were encouraged more in this regard than were girls.

Interestingly, several studies of nonhuman primates suggest similar gender differences. Specifically, mothers of male toddlers began weaning earlier than mothers of female toddlers. Also, infant clinging was rejected earlier in the case of males than in the case of females (Table 12.5.2.11).

Table 12.5.2.11. Parental encouragement of offspring independence.

Nature of Any Difference	Prepubertal		
	Toddler	Early Childhood	Childhood
Males more	**APE** *Chimpanzee*: Nicolson 1977 (weaned earlier) **PRIMATE (EXCEPT APE)** *Pigtail Macaque*: GD Jensen et al. 1967 (weaned earlier); J Erwin et al. 1975 (weaned earlier); *Japanese Macaque*: Itani 1959 (weaned earlier); *Rhesus Macaque*: Hinde & Spencer-Booth 1967 (mother rejects toddler clinging); LE White & Hinde 1975 (mother rejects toddler clinging)	**NORTH AMERICA** *United States*: Block 1983; Weitzman et al. 1985	**NORTH AMERICA** *United States*: Fagot & Hagen 1991 (school age)
No signif. difference			
Females more			

12.5.2.12. Parental Encouragement of Offspring Competitiveness

The available research on sex differences in terms of receiving more encouragement in terms of being competitive has concurred that sons receive more encouragement than do daughters (Table 12.5.2.12).

Table 12.5.2.12. Parental encouragement of offspring competitiveness.

Nature of Any Difference	Prepubertal	Postpubertal
	Childhood	Adult
Males more	**NORTH AMERICA** *United States*: Maltz & Borker 1982; JA Hall 1987	**NORTH AMERICA** *United States*: JH Block 1983 (by parents)
No signif. difference		
Females more		

12.5.2.13. Recipient of Parental Discipline and Restrictive Commands

The studies located pertaining to which sex is most likely to receive parental discipline or restrictive commands (e.g., Don't touch that!) from their parents found that males receive more such commands than do females (Table 12.5.2.13). This conclusion is consistent with one reached from a meta-analysis by Lytton and Romney (1991).

Table 12.5.2.13. Recipient of parental discipline and restrictive commands.

Nature of Any Difference	Prepubertal	
	Infant	Childhood
Males receive more	**NORTH AMERICA** *United States*: Snow et al. 1983 (by father)	**LATIN AMERICA** *Mexico*: Bronstein 1984 **NORTH AMERICA** *United States*: Eisenberg et al. 1996
No signif. difference		
Females receive more		

12.5.2.14. Relationship between Parental Socioeconomic Background and Occupational Aspirations of Their Offspring

The relationship between parental socioeconomic status and the occupational aspirations of their offspring has been investigated by a few studies with respect to possible sex differences. All such studies have concluded that females exhibit a stronger tendency to be reared by high status parents and to aspire for higher status occupations than was true for males (Table 12.5.2.14).

Table 12.5.2.14. Relationship between parental socioeconomic background and occupational aspirations of their offspring.

Nature of Any Difference	Postpubertal
	Adolescent
Stronger for males	
No signif. difference	
Stronger for females	**NORTH AMERICA** *United States*: RH Turner 1966; WH Sewell & Shah 1967; WH Sewell & Shah 1968a; WH Sewell & Shah 1968b; AE Bayer 1969; RM Hauser 1971; KL Alexander & Eckland 1974; M Hout & Morgan 1975

12.5.3. Treatment of Others by Teachers (Educators) and by Students

A substantial number of studies have investigated differences in how boys and girls are treated by teachers. The results of these studies, as well as those pertaining to treatment by health care workers, are reviewed below.

12.5.3.1. Being Hired

According to one study of hiring practices at universities, female applicants were more likely than their male counterparts to be hired for teaching vacancies (Table 12.5.3.1).

Table 12.5.3.1. Being hired.

Nature of Any Difference						Postpubertal	
						Adult	
Males receive more							
No signif. difference							
Females receive more						**NORTH AMERICA** *United States*: Irvine 1996 (college professors)	

12.5.3.2. Receiving Attention From Teachers in General

Numerous studies have compared the amount of time teachers give to boys and girls in their classes. As shown in Table 12.5.3.2, the vast majority of these studies have concluded that males receive more attention (both positive and negative) than do females. Note that the studies cited in this table differ from those cited in Table 12.5.3.3 (which follows) only in the sense that the latter table has to do with attention of a specific instructional nature.

Table 12.5.3.2. Receiving attention from teachers in general.

Nature of Any Difference	Prepubertal				Postpubertal		Multiple Age Categories
				Childhood	Adolescent	Adult	
Males receive more				**EUROPE** *Britain*: Croll 1985 (2nd graders) **NORTH AMERICA** *United States*: WJ Meyer & Thompson 1963; Brophy & Good 1970 (1st grade); Brophy & Good 1974; Brophy 1985 (teachers pay more attention to boys, both positively and negatively); Irvine 1986 (K-5th grade); Meece 1987 (teachers pay more attention to boys both positively & negatively); Eccles 1989	**EUROPE** *Britain*: Delamont 1984 (Wales, high school); Dart & Clarke 1988; Salisbury & Jackson 1996 **NORTH AMERICA** *United States*: Good et al. 1973; JR Becker 1981* (math class); JR Becker 1982 (math class); JE Parsons et al. 1982; AW Simpson & Erickson 1983; MG Jones 1987 (science class); Omvig 1989 (teachers of both sexes criticize/correct male students more); MG Jones & Wheatley 1990 (science class); Oakes 1990 (math & science class); Barba & Cardinale 1991 (asked more questions in science class); D Smith 1991 (teachers of both sexes criticize/correct male students more)	**NORTH AMERICA** *United States*: Stallings 1979; Becker 1981*	**EUROPE** *Britain*: Spender 1982 (high school & college) **NORTH AMERICA** *United States*: Sadker & Sadker 1986
No signif. difference							
Females receive more					**EUROPE** *Britain*: Worrall & Tsarna 1987 (teachers encouraging students to learn a second language)		

12.5.3.3. Instructional Contact With Students by Teachers

Several studies have sought to determine if males or females receive more contact from their teachers, thereby possibly helping to explain gender differences in performance in various subject areas. Assessments are sometimes made based on observations using one-way mirrored classrooms, while in other studies, teachers are asked to maintain their own records. As shown in Table 12.5.3.3, inconsistent findings have typified studies of school age children. For adolescents, however, nearly all studies have concluded that males received more instructional contact, especially in science classes.

Table 12.5.3.3. Instructional contact from teachers.

Nature of Any Difference	Prepubertal	Postpubertal
	Childhood	Adolescent
Males receive more	**NORTH AMERICA** *United States*: WJ Meyer & Thompson 1956; WJ Meyer & Thompson 1963; PS Sears & Feldman 1966 (general); Leinhardt et al. 1979* (help with math); Sadker et al. 1984 (teachers of both sexes interact more with male students); SM Bailey 1993 (teachers of both sexes interact more with male students); WM Roth 1996 (challenge more in science education)	**ASIA** *Taiwan*: She 1997 (science class); She 1998 (science class); She 1999 (science class); She 2000 (science class) **NORTH AMERICA** *Canada*: J Duffy et al. 2001 (high school, teachers of both sexes interact more with male students); *United States*: MG Jones & Wheatley 1989 (challenge more in science education); Omvig 1989 (high school vocational class instructors interact more with male students including both praise and criticism); MG Jones & Wheatley 1990 (science class); Tobin 1990 (science class); D Smith 1992 (high school business education); Bellamy 1994* (male junior high school science teachers interact more with male students); Sadker & Sadker 1994 (science class); Greenfield 1997 (science class)
No signif. difference	**NORTH AMERICA** *United States*: Davis & Slobadian 1967 (teaching of reading); TL Good & Brophy 1971 (general)	**NORTH AMERICA** *United States*: Bellamy 1994* (female junior high science teachers)
Females receive more	**NORTH AMERICA** *United States*: Biber et al. 1972 (general); Leinhardt et al. 1979* (help with reading)	

12.5.3.4. Positive Student-Teacher Relationships

Studies of how students are treated by teachers have indicated that females receive more positive treatment than do males (Table 12.5.3.4).

Table 12.5.3.4. Positive student-teacher relationships.

Nature of Any Difference	Prepubertal
	Childhood
Male students receive more	
No signif. difference	
Female students receive more	**NORTH AMERICA** *United States*: Lippitt & Gold 1959; WJ Meyer & Thompson 1963; Schmuck & van Egmond 1965

12.5.3.5. Praise/Reward From Teacher

Several studies have sought to determine if boys or girls receive greater praise from their teachers. These studies have reached conflicting results, but most suggest that boys receive more praise for academic accomplishments whereas girls are most often praised for good behavior in school (Table 12.5.3.5).

Table 12.5.3.5. Praise/reward from teacher.

Nature of Any Difference	Prepubertal	
	Early Childhood	Childhood
Males receive more		**MIDDLE EAST** *Israel*: Ben Tsvi-Mayer et al. 1989 (considered outstanding students) **NORTH AMERICA** *United States*: Torrance 1962; Torrance 1965 (for creative activities); Dweck et al. 1978* (intellectual aspects of schoolwork); JR Becker 1982; MG Jones 1987
No signif. difference		
Females receive more	**NORTH AMERICA** *United States*: Faggot & Patterson 1969 (rewarded with special privileges); KA Martin 1998:503 (spoke to in a kinder and softer voice)	**NORTH AMERICA** *United States*: WJ Meyer & Thompson 1956 (for behavior); R Lippitt & Gold 1959; P Sears & Feldman 1966 (for behavior); PW Jackson & Lahaderne 1967 (for behavior); Westbrook 1970 (for behavior); Dweck et al. 1978* (for neatness in schoolwork)

12.5.3.6. Recipient of Teacher Discipline

All studies of discipline by teachers have concluded that boys receive more disciplinary actions than do girls (Table 12.5.3.6).

Table 12.5.3.6. Recipient of teacher discipline.

Nature of Any Difference	Prepubertal		
	Early Childhood	Childhood	Adolescent
Males receive more	**NORTH AMERICA** *United States*: KA Martin 1998:504	**NORTH AMERICA** *United States*: Ullman 1952; Meyer & Thompson 1956; R Lippitt & Gold 1959; Spaulding 1963; PW Jackson & Lahaderne 1967; Etaugh & Hughes 1975; LE Berk & Lewis 1977; Minuchin & Shapiro 1983	**EUROPE** *Britain*: Spender 1982; Delamont 1984; Croll 1985 **NORTH AMERICA** *United States*: Brophy & Good 1970; Irvine 1986 **OCEANIA** *Australia*: Leder 1987
No signif. difference			
Females receive more			

12.5.3.7. Sex Segregation in School

Do male or female students benefit from being taught in sex-segregated classes or even from attending sex-segregated schools? This question has been addressed by several studies.

The basis for assessing the benefits (or lack thereof) in the studies reviewed in Table 12.3.5.7 have to do with performance on various academic achievement tests. In this table, the sex of students tested are indicated following each study as is whether the segregation was specific to a class being taken or to an entire school (the latter being more common in the studies cited).

Table 12.5.3.7 presents somewhat conflicting evidence regarding any beneficial effects of single-sex education, although nearly all of the evidence suggests that females benefit more than do males, especially in math and science, if they attend sex-segregated schools. For males, most of the studies indicate either no significant effect or that males in single-sex classes and schools actually do worse academically than males who attend sex-integrated classes and schools.

Table 12.5.3.7. Sex segregation in school.

Nature of Any Difference	Postpubertal
	Adolescent
Student performance enhanced	**EUROPE** *Britain*: R Dale 1974* (school, female, in general); VA Lee & Bryk 1986 (school, female, in math); Lawrie & Brown 1992 (school, female, in science); Arnot et al. 1996 (school, female, in science); Gillibrand et al. 1999 (school, female, in physics); *Denmark*: Kruse 1996 (school, female, in science) **NORTH AMERICA** *United States*: Riordan 1985 (school, female & male, in general); V Lee & Bryk 1986 (school, female & male, in general); Lepore & Warren 1997 (school, female, in general) **OCEANIA** *Australia*: DJ Young & Fraser 1990 (school, female & male in science); L Woodward et al. 1999 (school, female & male, in general)
No signif. effect	**EUROPE** *Belgium*: Van de gaer et al. 2004:317* (class, female, in math & language; male, in math); *Britain*: P Robinson & Smithers 1999 (school, female, overall achievement); *England*: C Jackson & Smith 2000:414* (school, female & male, in math) **OCEANIA** *Australia*: HW Marsh & Rowe 1996:153 (class, female & male in math)
Student performance suffers	**EUROPE** *Belgium*: Van de gaer et al. 2004:317* (class, male, in language); *Britain*: R Dale 1974* (school, female, in general); C Jackson & Smith 2000:414* (school, male, in overall achievement) **NORTH AMERICA** *United States*: Lepore & Warren 1997 (school, female, in general)

12.5.3.8. Evaluation of Teacher/Instructor by Student

Numerous studies have investigated whether male or female teachers receive higher teacher ratings by their students (most of which have been conducted among college students). While many studies have found no significant differences, those that have reported differences have generally given male teachers higher ratings in subject-matter competence and females higher ratings in concern and helpfulness to students (Table 12.5.3.8).

Table 12.5.3.8. Evaluation of teacher/instructor by student.

Nature of Any Difference	Postpubertal	
	Adolescent	Adult
Male teachers rated higher	**NORTH AMERICA** *United States*: HN Mischel 1974 (math & science courses)	**NORTH AMERICA** *Canada*: P Caplan 1993 (college); *United States*: Hudiburg 1965; PA Goldberg 1968; Choy 1969; Elmore & LaPointe 1975 (college); N Eagle 1977; Aleamoni 1978 (anthropology); Lohr 1978; J Lombardo & Tocci 1979* (peer professor ratings); Unger 1979; SK Bennett 1982* (college); Nussbaum 1982; Basow & Silberg 1987:313* (college, especially by male students, peer professor ratings); Kierstad et al. 1988 (college); Fandt & Stevens 1991 (college, business courses); Basow 1995* (college); Bernstein & Burke 1995* (college, more knowledgeable)
No signif. difference		**EUROPE** *Spain*: J Fernandez & Mateo 1997 (college) **NORTH AMERICA** *United States*: WP Wilson 1932; HY Willaims 1965; BD Walker 1968; Bausell & Magoon 1972; Reimanis 1972; Alciatore 1973; Elmore & LaPointe 1974 (college, teacher effectiveness); Elmore & LaPointe 1975 (college, teacher effectiveness); MB Harris 1975 (college); Hesselbart 1977 (college); Kaschak 1978 (college); Barnett & Littlepage 1979 (college, friendliness); Goebel & Cashen 1979 (college); S Kay 1979; J Lombardo & Tocci 1979* (college); Bray & Howard 1980; SK Bennett 1982* (college, teacher effectiveness); Basow & Distenfeld 1985 (college, teacher effectiveness); Basow & Silberg 1987* (college); Wheeless & Potorti 1989; Basow 1990 (college, enthusiasm, friendliness); EG Shapiro 1990; Statham et al. 1991; KA Feldman 1993 (college); Basow 1995* (by females, college); Basow & Rubenfeld 2003 (college)
Females teachers rated higher		**NORTH AMERICA** *United States*: Heilman & Armentrout 1936; Hanke 1970; AP King 1971; Aleamoni & Yimer 1973; South 1975; DL Brown 1976; Elmore & Pohlmann 1978; RD Freedman et al. 1979; SK Bennett 1982*; RA Hoffman 1984; Basow & Distenfeld 1985 (college, more enthusiastic, friendly, and personable); Basow & Silberg 1987* (college, more friendly and personable); Basow & Silberg 1987; Sidanius & Crane 1989; Wigington et al. 1989; Basow 1995* (by females, college); Bernstein & Burke 1995* (college, more concerned with students)

12.5.3.9. Evaluation of Teachers by Other Teachers

Research involving teachers or administrators rating teachers have been conducted in academia. Most of it has concluded that there is no significant difference in the average ratings given to male and female teachers (Table 12.5.3.9).

Table 12.5.3.9. Evaluation of teachers by other teachers.

Nature of Any Difference	Postpubertal
	Adult
Male teachers rated higher	**NORTH AMERICA** *United States*: Kaschak 1978 (peer professor ratings); Steinpreis et al. 1999 (experimental study)
No signif. difference	**NORTH AMERICA** *United States*: Hesselbart 1977 (college); Goebel & Cashen 1979 (college); J Lombardo & Tocci 1979 (college); Basow & Distenfeld 1985 (college); Basow 1990 (college)
Females teachers rated higher	

12.5.3.10. Grades Given to Students According to the Instructor's Sex

According to Table 12.5.3.10, research has either failed to find a significant gender difference among teachers in the grades they give or that females give higher grades than do males, at least when grading children.

Table 12.5.3.10. Grades given to students according to the instructor's sex.

Nature of Any Difference	Prepubertal	Postpubertal	
	Childhood	Adolescent	Adult
Males receive higher grades			
No significant effect	**NORTH AMERICA** *United States*: Arnold 1968	**NORTH AMERICA** *United States*: RE Robb & Robb 1999*	**NORTH AMERICA** *United States*: RE Robb & Robb 1999*
Females receive higher grades	**MIDDLE EAST** *Israel*: J Klein 2004 **NORTH AMERICA** *United States*: RL Spaulding 1963; DA Bennett 1966; Lahaderne 1967		

12.5.3.11. Teacher Evaluation of Students According to the Student's Sex

The research in which teachers have been asked to evaluate male and female students has been confined to the study of school age children. As shown in Table 12.5.3.11, these studies have found teachers giving higher ratings to boys with respect to having problems in school. Girls, on the other hand, receive higher ratings in terms of doing well in school.

Table 12.5.3.11. Teacher evaluation of students according to the student's sex.

Nature of Any Difference	Prepubertal				
			Childhood		
Males more			**EUROPE** *Greece*: Hopf & Hatzichristou 1999:9* (males rated more antisocial/troublesome by teachers) **NORTH AMERICA** *United States*: Arnold 1968 (both male and female teachers, see boys as having more academic problems); Schaeffer 1968 (both male and female teachers, see boys as having more academic problems)		
No signif. difference					
Females more			**EUROPE** *Greece*: Hopf & Hatzichristou 1999:9* (teachers rate girls better at math) **NORTH AMERICA** *United States*: Schmuck & van Egmond 1965 (girls did better in school overall according to teachers)		

12.5.3.12. Sex of the Teacher and Academic Performance of the Student

Research undertaken to determine if students perform better for teachers of one or the other sex has concluded that there are no differences, at least for students in primary school (Table 12.5.3.12).

Table 12.5.3.12. Sex of the teacher and academic performance of the student.

Nature of Any Difference	Prepubertal				
			Childhood		
Students perform better for male teachers					
No signif. difference			**NORTH AMERICA** *United States*: RL Spaulding 1963; DA Bennett 1966; Clapp 1966; Lahaderne 1967; McFarland 1969; Asher & Gottman 1973		
Students perform better for female teachers					

12.5.4. Being the Recipient of Nonverbal Social Actions

Research on which sex is more likely to be the recipient of various nonverbal social actions is summarized below.

12.5.4.1. Being the Recipient of Nonverbal Stimulation in General

The few studies that have sought to determine if newly born boys or girls are given greater nonverbal (physical) stimulation by their parents or guardians have all but one concluded that boys receive more than do girls (Table 12.5.4.1).

Table 12.5.4.1. Being the recipient of nonverbal stimulation in general.

Nature of Any Difference	Prepubertal					
	Infant			Childhood		
Males more	**EUROPE** *Sweden*: Winberg & de Chateau 1982 **NORTH AMERICA** *United States*: Thoman et al. 1972; JV Brown et al. 1975 (Blacks)					
No signif. difference						
Females more				**NORTH AMERICA** *Canada*: Dhami et al. 2005 (per prosocial act, high poverty group)		

12.5.4.2. Being the Recipient of Smiles From Others

Several studies have been undertaken to determine if a sex difference exists regarding the tendency to smile (which is considered elsewhere). Here, however, the issue is which sex might be the greater *recipient* of smiles from others. Of the four studies, three concluded that females received more smiles than did males; the remaining study found the opposite (Table 12.5.4.2).

Table 12.5.4.2. Being the recipient of smiles from others.

Nature of Any Difference					Postpubertal		Multiple Age Categories
						Adult	
Males receive more						**NORTH AMERICA** *United States*: CL Martin & Adams 1999 (from customers)	
No signif. difference							
Females receive more						**NORTH AMERICA** *United States*: Rosenthal 1976; Hinsz & Tomhave 1991	**NORTH AMERICA** *United States*: Weitz 1976

12.5.4.3. Being the Recipient of Social Support From Others

A couple of studies concluded that females were more likely than males to receive various forms of social support from others (Table 12.5.4.3).

Table 12.5.4.3. Being the recipient of social support from others.

Nature of Any Difference					Postpubertal		
						Adult	
Males receive more							
No signif. difference							
Females receive more						**EUROPE** *England*: S Matthews et al. 1999 (from acquaintances and relatives) **NORTH AMERICA** *United States*: Antonucci & Akiyama 1987 (elderly)	

12.5.4.4. Being the Recipient of Tactile Stimulation (Touching) From Others

According to two studies, baby girls are more likely than baby boys to receive various forms of tactile stimulation from adult care givers (Table 12.5.4.4).

Table 12.5.4.4. Being the recipient of tactile stimulation (touching) from others.

Nature of Any Difference	Prepubertal						
	Infant						
Males receive more							
No signif. difference							
Females receive more	**EUROPE** *France*: Millot et al. 1988; *Sweden*: Hwang 1978						

12.5.4.5. Being the Recipient of a Gesture of Politeness From Others

Two studies sought to determine if gender was related to the phenomenon of having one person open the door to a building or car for another. As shown in Table 12.5.4.5, in both cases, females were more likely to be the recipient of such a gesture than were males, and males were the one providing the service in nearly all cases. One study involved persons generally, while the other was confined to dating couples.

The social meaning of such a gesture as door opening for others may be disputed. Two authors characterized it as a form of "benevolent sexism" by males, reflecting their attempt to maintain dominance over women (Glick & Fiske 1996). This view may be questioned, however, since it would imply that royalty should open doors for commoners more than vice versa (in that royality are seen as dominant over commoners).

Table 12.5.4.5. Being the recipient of a gesture of politeness from others.

Nature of Any Difference	Postpubertal						
						Adult	
Males more often the recipient							
No signif. difference							
Females more often the recipient						**NORTH AMERICA** *United States*: Goldman et al. 1981 (door opening); Yoder et al. 2002 (college, among dating couples, door opening)	

12.5.4.6. Being the Recipient of a Prominent Obituary or Funeral

Nearly everyone in an industrialized country will receive an obituary when he or she dies, but most obituaries are less than a paragraph or two in length. Obituaries published in relatively large city or national newspapers and news magazines are typically reserved for relatively prominent citizens, and these obituaries have been subjected to content analysis in several studies regarding the extent to which they are prominently featured along with the length.

As shown in Table 12.5.4.6, studies have revealed that males are more likely to receive obituaries in a prominent newspaper when they die, and that their obituaries tend to be longer and more likely to include a photograph than the obituaries of females. At least one researcher examined obituaries published in both the early and the latter portions of the 20th Century and found considerable stability in the extent of these gender differences (Kearl, 1986).

The tendency for large-city newspapers to publish more and longer obituaries for men than for women who have died is likely to reflect gender differences in involvement in prominent occupations (such as law, politics, medicine, science, the military, and the arts) (Moremen & Cradduck, 1999:249), although sex discrimination by the staff of news organizations may also be a factor.

Table 12.5.4.6. Being the recipient of a prominent obituary or funeral.

Nature of Any Difference	Obituary Published	Length of Obituary (or Inclusion of a Photograph)	Funeral Elaboration
Males more	**NORTH AMERICA** *United States*: Kastenbaum et al. 1977* (*Boston Globe*, *New York Times*); Spilka et al. 1979*; Kearl 1986*; Halbur & Vandagriff 1987*; Maybury 1995*; Marks & Piggee 1998 (*Arkansas Gazette*); Moremen & Cradduck 1999* (*New York Times*, *Los Angeles Times*, *Boston Globe*)	**NORTH AMERICA** *United States*: Kastenbaum et al. 1977*; Spilka et al. 1979*; Kearl 1986*; Halbur & Vandagriff 1987*; Maybury 1995*; Moremen & Cradduck 1999* (*New York Times*, *Los Angeles Times*, *Boston Globe*, *Miami Herald*)	**INTERNATIONAL** *Multiple Preliterate Societies*: Whyte 1978:217* (11of 84 societies)
No signif. difference	**NORTH AMERICA** *United States*: Moremen & Cradduck 1999* (*Miami Herald*); Spilka et al. 1979* (*Denver Post*)		**INTERNATIONAL** *Multiple Preliterate Societies*: Whyte 1978:217* (73of 84 societies)
Females more			

12.5.4.7. Popularity

Popularity refers to the extent to which an individual is chosen as a recipient of social interactions from others. It is usually assessed in terms of observing interactions with others or by asking persons to name their favorite friends or the individuals with whom they most often socialize. The findings with respect to any gender differences in popularity have been quite inconsistent (Table 12.5.4.7). Some of the inconsistencies may depend on the specific nature of the tasks or situations in which subjects are involved.

Table 12.5.4.7. Popularity.

Nature of Any Difference	Prepubertal		Multiple Age Categories
	Early Childhood	Childhood	
Males more		**NORTH AMERICA** *United States*: Tryon 1939 (when one is a leader and good at games)	**NORTH AMERICA** *United States*: Feldstein et al. 2001:803 (male speakers more socially attractive to both sexes)
No signif. difference	**NORTH AMERICA** *United States*: McCandless et al. 1961; S Moore & Updegraff 1964		
Females more	**NORTH AMERICA** *United States*: Parten 1933; HR Marshall & McCandless 1957 (sociocentric choice test)	**NORTH AMERICA** *United States*: Tryon 1939 (when polite & considerate); Bonney 1942 (social acceptance); Bonney 1944 (social acceptance); Tuddenham 1952 (females given higher peer ratings)	

12.5.4.8. Receiving Campaign Funding

Two studies concluded that men and women were statistically equivalent in terms of obtaining contributions for political campaigns (Table 12.5.4.8).

Table 12.5.4.8. Receiving campaign funding.

Nature of Any Difference					Postpubertal	
						Adult
Males more						
No signif. difference						**NORTH AMERICA** *United States*: Burrell 1994 (national elections); Dolan 1997 (national elections)
Females more						

12.5.5. Being the Recipient of Verbal Social Actions

This section considers gender differences in the extent to which subjects are the recipients of linguistic or verbal stimulation from others.

12.5.5.1. Being the Recipient of Verbal Stimulation in General

Three studies were located that compared the extent to which parents talked to their young infants. The results were inconsistent, with one study concluding that parents talked more to baby boys, while the other two concluded that baby girls received more verbal stimulation (Table 12.4.5.1).

Table 12.5.5.1. Being the recipient of verbal stimulation in general.

Nature of Any Difference	Prepubertal					
	Infant	Toddler				
Males more	**NORTH AMERICA** *United States*: JV Brown et al. 1975 (Blacks)					
No signif. difference						
Females more	**NORTH AMERICA** *United States*: Thoman et al. 1972	**NORTH AMERICA** *United States*: Koblinsky et al. 1997 (low income Black mothers)				

12.5.5.2. Receiving a Formal Burial

A few studies have compared the number of males and females who were the recipients of a formal burial in ancient times. These studies concluded that males were more likely than females to have received such burials (Table 12.5.5.2).

Table 12.5.5.2. Receiving a formal burial.

Nature of Any Difference		Deceased Multiple Age Categories
Males more		**EUROPE** *Britain*: Hedges 1984:186 (prehistoric); *France*: Defleur 1987:215 (upper paleolithic) **OCEANIA** *Australia*: Collier 1982:13 (19th Century)
No signif. difference		
Females more		

12.6

VICTIMIZATION

Victimization refers to individuals being injured or otherwise violated by another individual. Large numbers of studies have compared males and females with respect to their rates of victimization and closely related phenomena.

12.6.1. Victim of Physical Aggression (Except Criminal)

The tables that follow pertain to victimization from various forms of aggression and violence that are not so severe as to be considered criminal. (Criminal forms of victimization are given consideration in a subsequent subsection.)

12.6.1.1. Being Treated Aggressively in General

Studies suggest that males are generally treated in a rougher or more aggressive manner than is true for females (Table 12.6.1.1.).

Table 12.6.1.1. Being treated aggressively in general.

Nature of Any Difference	Prepubertal	Postpubertal
	Early Childhood	Adult
Males receive more	**NORTH AMERICA** *United States*: Sackin & Thelen 1984 (by both sexes)	**NORTH AMERICA** *United States*: Carli 1989 (by both sexes)
No signif. difference		
Females receive more		

12.6.1.2. Victim (Recipient) of Physical Aggression in General (Except Criminal)

Noncriminal forms of physical aggression usually include scuffles and minor acts of assault in which the victim suffers bruises and scratches at most. Such aggression is more common among children and adolescents as they interact with age-mates. Table 12.6.1.2 indicates that males are more likely than females to be the victims of such physical aggression, at least through adolescence.

Table 12.6.1.2. Victim (recipient) of physical aggression in general (except criminal).

Nature of Any Difference	Prepubertal		Postpubertal	
	Early Childhood	Childhood	Adolescent	Adult
Males more	**NORTH AMERICA** *United States*: NR Crick et al. 1997 (from peers); Ostrov & Keating 2004 (from peers)	**NORTH AMERICA** *Canada*: Dhami et al. 2005 (low poverty schools); *United States*: McNeilly-Choque et al. 1996 (from peers); Crick & Bigbee 1998; Crick et al. 1999; A Russell et al. 2003* (from peers); Thompson et al. 2004 (abuse) **OCEANIA** *Australia*: A Russell et al. 2003* (from peers)	**EUROPE** *Switzerland*: Kuntsche & Klingemann 2004:387 (hit by peers)	**NORTH AMERICA** *United States*: AH Buss 1966 (electric shock); SP Taylor & Epstein 1967; Youssef 1968 (electric shock); AH Buss 1971 (electric shock); Shope et al. 1978 (experimental); Pimlott-Kubiak & Cortina 2003 (long-term suffering) **RODENT** *Gerbil*: HH Swanson 1974 (by mixed pair females)
No signif. difference				**NORTH AMERICA** *United States*: AV Shack et al. 2004 (records obtained from psychiatric patients)
Females more				**NORTH AMERICA** *United States*: A Jacobson & Richardson 1987 (records from psychiatric patients) **PRIMATE (EXCEPT APE)** *Spider Monkey*: LM Fedigan & Baxter 1984 (by males) **RODENT** *Rat*: Boice & Adams 1983 (intruder into a group)

12.6.1.3. Victim of Relational Aggression

Relational aggression involves attempts to punish someone by withholding or withdrawing friendship commitments or by gossiping. As shown in Table 12.6.1.3, all of the known studies have found females to be the recipient of this form of aggression more than males.

Table 12.6.1.3. Victim of relational aggression.

Nature of Any Difference	Prepubertal	
	Early Childhood	Childhood
Males more		
No signif. difference		
Females more	**NORTH AMERICA** *United States*: NR Crick et al. 1997 (from peers); Ostrov & Keating 2004 (from peers)	**NORTH AMERICA** *United States*: McNeilly-Choque et al. 1996 (from peers); Crick & Bigbee 1998; Crick et al. 1999; A Russell et al. 2003* (from peers) **OCEANIA** *Australia*: A Russell et al. 2003* (from peers)

12.6.1.4. Being the Victim of Dating Violence (Victim of Intimate Partner Violence)

Research on dating violence has rather consistently concluded that females are more likely than males to have been physically victimized in a dating relationship (Table 12.6.1.4). A couple of exceptional studies failed to find statistically significant differences between the sexes. If psychological abuse during courtship is considered, more males than females have been found to have been victimized.

Table 12.6.1.4. Being the victim of dating violence (victim of intimate partner violence).

Nature of Any Difference				Postpubertal		Multiple Age Categories
				Adolescent	Adult	
Males victimized more					**NORTH AMERICA** *Canada*: Pederson & Thomas 1992 (college, psychological abuse); *United States*: Kasian & Painter 1992 (college, psychological abuse)	
No signif. difference					**EUROPE** *Britain*: R West et al. 1990:479 (college) **NORTH AMERICA** *United States*: J Katz et al. 2002 (college)	
Females victimized more				**AFRICA** *South Africa*: Swart et al. 2002:389 **NORTH AMERICA** *United States*: Foshee 1996* (sustained physical injuries); Capaldi & Crosby 1997	**NORTH AMERICA** *United States*: Plass & Gressner 1983 (young); K Lane & Gwartney-Gibbs 1985 (young, sustained more injuries); Deal & Wampler 1986 (young); Makepeace 1986:386 (serious violence); FS Christopher et al. 1993 (college, to gain sexual access); Foshee 1996* (sustain more injuries); Greenfield et al. 1998; SM Jackson et al. 2000 (physical aggression from a dating partner); J Katz et al. 2002 (college, to gain sexual access)	**NORTH AMERICA** *United States*: Makepeace 1986 (sustained physical injuries); Stets & Pirog-Good 1987 (sustained physical injuries); Stets & Pirog-Good 1989 (sustained physical injuries)

12.6.1.5. Being the Victim of Sexual Harassment

All of the available research has concluded that females are more often the victims of sexual harassments than are males (Table 12.6.1.5).

Table 12.6.1.5. Being the victim of sexual harassment.

Nature of Any Difference				Postpubertal		
				Adolescent	Adult	
Males victimized more						
No signif. difference						
Females victimized more				**EUROPE** *Britain*: Hartless et al. 1995:119	**ASIA** *China*: CS Tang et al. 1996 (college) **NORTH AMERICA** *United States*: JW Adams et al. 1983 (college); Reilly et al. 1986; LF Fitzgerald et al. 1988*; LF Fitzgerald & Ormerod 1991 (college); Culbertson & Rosenfeld 1994 (in the military); US Merit Systems Protection Board 1995; Shepela & Levesque 1998 (college); Stockdale 1998:528; Kalof et al. 2001:296; Menard et al. 2003 (college)	

12.6.1.6. Being Pressured to Have Sex

Nearly all of the available research has indicated that females are more often the victims of pressure to have sex than are males (Table 12.6.1.6).

Table 12.6.1.6. Being pressured to have sex.

Nature of Any Difference				Postpubertal		
				Adolescent	Adult	
Males victimized more						
No signif. difference					**NORTH AMERICA** *United States*: Rouse 1988:316 (college, verbally pressured)	
Females victimized more				**NORTH AMERICA** *United States*: Erickson & Rapkin 1991 (sexual coercion victim); Brenner 1994 (sexual coercion victim)	**NORTH AMERICA** *United States*: Sandberg et al. 1987 (sexual coercion victim, college); Muehlenhard & Cook 1988 (sexual coercion victim, college); Poppen & Segal 1988 (sexual coercion victim, college); Bergman 1992 (pushy sexual behavior); Sorenson & Siegel 1992 (sexual coercion victim); Aizenman & Kelley 1988 (sexual coercion victim, short of intercourse, college); Byers & O'Sullivan 1998:156 (sexual coercion victim); O'Sullivan et al. 1998 (sexual coercion victim, college)	

12.6.1.7. Being Physically Bullied

Victims of physical bullying are often pushed around and even beaten by others. According to most studies, males are more often bullied than are females (Table 12.6.1.7).

Table 12.6.1.7. Being physically bullied.

Nature of Any Difference	Prepubertal		Postpubertal
	Early Childhood	Childhood	Adolescent
Males more		**EUROPE** *Britain*: I Rivers & Smith 1994:363*; *Italy*: Baldry & Farrington 1999; *Netherlands*: Verkuyten & Thijs 2002:216 **NORTH AMERICA** *United States*: PK Smith & Shu 2000	**EUROPE** *Britain*: I Rivers & Smith 1994*; G Salmon et al. 1998; MJ Boulton et al. 1999*; *Finland*: Bjorkqvist et al. 1992; Kaltiala-Heino et al. 1999; *Malta*: Borg 1998 (young); *Scotland*: Hunter et al. 2004 (young); *Sweden*: MJ Boulton et al. 1999* **MIDDLE EAST** *Israel*: Gofin et al. 2002:175 **NORTH AMERICA** *United States*: I Whitney & Smith 1993; K Rigby 2000
No signif. difference	**EUROPE** *Spain*: Monks et al. 2002:466	**EUROPE** *Britain*: Young & Sweeting 2004*	**EUROPE** *Britain*: Young & Sweeting 2004*; *Switzerland*: Kuntsche & Klingemann 2004:387
Females more			

12.6.1.8. Being Verbally Bullied

Verbal bullying involves persistently insulting and teasing someone. One study of this form of bullying indicated that females were more likely than males to be victimized (Table 12.6.1.8).

Table 12.6.1.8. Being verbally bullied.

Nature of Any Difference	Prepubertal	Postpubertal
	Childhood	Adolescent
Males more		
No signif. difference	**EUROPE** *Britain*: Young & Sweeting 2004*	**EUROPE** *Britain*: Young & Sweeting 2004*
Females more		**EUROPE** *Finland*: Bjorkqvist et al. 1992; *Sweden*: Olweus 1991

12.6.1.9. Help-Seeking by Bullied Victims

Among persons who are bully victims, most studies have found females to be more likely than males to seek help from an adult (Table 12.6.1.9).

Table 12.6.1.9. Help-seeking by bullied victims.

Nature of Any Difference	Postpubertal
	Adolescent
Males more	**EUROPE** *Malta*: Borg 1998 (young)
No signif. difference	
Females more	**EUROPE** *Britain*: S Sharp 1995; D Glover et al. 2000; *Scotland*: Hunter & Boyle 2004 (young); Hunter et al. 2004:383 (young)

12.6.1.10. Being the Recipient of Unwelcome/Unwanted Sexual Behavior

As shown in Table 12.6.1.10, studies have revealed that females are more likely than males to be the recipient of unwelcome sexual overtures. These events can range from slight annoyances to frightening instances of sexual harassment and stalking. In the one animal study that was located, the unwelcome nature of the events was inferred by the sort of aggressive rebuff that was exhibited by the recipient of the overtures.

Table 12.6.1.10. Being the recipient of unwelcome/unwanted sexual behavior.

Nature of Any Difference	Prepubertal				Postpubertal		
				Childhood	Adolescent	Adult	
Males more							
No signif. difference							
Females more				**PRIMATE (EXCEPT APE)** *Japanese Macaque*: BB Glick et al. 1986	**OCEANIA** *New Zealand*: Jackson et al. 2000	**NORTH AMERICA** *United States*: J Carlson 1976 (engaging, among married couples); Muehlenhard & Cook 1988; Patton 1994 (stalking); Sprecher et al. 1994 (engaging); Lottes & Weinberg 1996 (college); De Becker 1997 (stalking); O'Sullivan & Allgeier 1998 (engaging); Tjaden & Thoennes 1998 (stalking); Pimlott-Kubiak & Cortina 2003 (stalking and suffer from sexual violence) **OCEANIA** *Australia*: McConaghy & Zamir 1995	

12.6.2. Crime Victimization

Victimization that is sufficiently severe as to be proscribed by criminal statutes will now be given consideration, although it should be recognized that the division between criminal and noncriminal victimization is often blurry.

12.6.2.1. Being the Victim of Crime in General

All of the available studies agree that males are more likely than females to be the victims of crime in general (Table 12.6.2.1).

Table 12.6.2.1. Being the victim of crime in general.

Nature of Any Difference					Postpubertal		Multiple Age Categories
					Adolescent	Adult	
Males victimized more					**EUROPE** *Britain*: J Warner et al. 2005* (criminal violence, 17th & 18th Century)	**EUROPE** *Britain*: J Warner et al. 2005* (criminal violence, 17th & 18th Century)	**EUROPE** *Scotland*: Monaghan 1997:22 **NORTH AMERICA** *Canada*: Keane & Arnold 1996:466 (property crime); *United States*: Lebowitz 1975; Empey 1982:138; Warr 1984; Jensen & Brownfield 1986; Akers et al. 1987; Liska et al. 1988; Harlow 1991; Karmen 1991; Mayhew et al. 1993; Sacco et al. 1993
No signif. difference							
Females victimized more							

12.6.2.2. Being the Victim of Murder

A large number of studies have sought to determine if males or females are more likely to be the victims of murder. As shown in Table 12.6.2.2, nearly all of these studies have concluded that males are more likely than females to be such victims.

Table 12.6.2.2. Being the victim of murder.

Nature of Any Difference	Prepubertal				Postpubertal		Multiple Age Categories
	Infants					Adult	
Males victimized more	**INTERNATIONAL** *Multiple Countries*: Lester 1991a:84 (40 countries, babies)					**AFRICA** *South Africa*: Lerer 1992* **NORTH AMERICA** *United States*: Waldron 1982:73	**AFRICA** *South Africa*: Southall 1960:217 (Alur tribe); Butchart & Brown 1991; Lerer 1992:95*; *Uganda*: Mushanga 1970; *Various African Tribal Societies*: Bohannan 1967:219; Hewlett 1991:20 **ASIA** *Ceylon*: Jayewardene & Ranasinghe 1963; *Russia*: Mesle et al. 1994; *Soviet Union*: Wasserman & Varnik 1998 **EUROPE** *Britain*: M Shaw et al. 2005 (from 1980-2000); *Denmark*: Svalastoga 1956; *England*: McClintock 1963:42; Hair 1971 (16th Century); Givern 1977 (13th Century); Hanawalt 1979:153 (14th Century); *Finland*: Koskinen & Martelin 1994:1392; Martikainen 1995:365; *France*: Peyeferitte 1976; *Germany*: Sessar 1973; Stephan 1976; EA Johnson 1985; *Netherlands*: van Dijk & Vianen 1978:17; *Sweden*: von Hofer 1990:31 (19th Century) **MIDDLE EAST** *India*: Elwin 1943; Driver 1961; Rao 1968 **NORTH AMERICA** *Canada*: Gartner 1995:200; D Lester 1994b; *United States*: Brearley 1932:79; Langberg 1967:2; Voss & Hepburn 1968:501; Shin et al. 1977:400; Tardiff 1985:632; Verbrugge 1985b:158; US Department of Justice 1988:28; Kellermann & Mercy 1992; CR Block 1993:284; National Center for Health Statistics 1993; MD Smith & Kuchta 1995:669; Geronimus et al. 1996; Andon 1997:25; Powell 1997; Kramarow et al. 1999 **OCEANIA** *Australia*: A Wallace 1986; Day & Sherrard 1996:286 **INTERNATIONAL** *Multiple Countries*: Verkko 1967:38; Gartner et al. 1990:600; *Several Industrial Countries*: C Pritchard & Evans 2001:88
No signif. difference							
Females victimized more	**MIDDLE EAST** *India*: Nath 1973 (infanticide by parents, 19th Century); R Jeffery et al. 1984 (infanticide by parents); Chunkath & Athreya 1997 (infanticide by parents)						**EUROPE** *Italy*: Pollack 1950:80 (19th Century) **OCEANIA** *Australia*: Mouzos 1999:45 (resulting from domestic violence)

12.6.2.3. Being the Victim of Physical Assault/Violent Crime (Non-Sexual)

Findings pertaining to which sex is most likely to be the victim of physical assault or violent crime of a general or non-sexual nature have not been entirely consistent. Nearly all of the findings pertaining to adolescents have concluded that males are more often than females to be assaulted. However, in the case of children, adults, and multiple aged subjects, the evidence tends to suggest the opposite (Table 12.6.2.3).

Table 12.6.2.3. Being the victim of physical assault/violent crime (non-sexual).

Nature of Any Difference	Prepubertal				Postpubertal		Multiple Age Categories
				Childhood	Adolescent	Adult	
Males victimized more					**EUROPE** *England*: Hough & Mayhew 1983; Gottfredson 1984; Hough & Mayhew 1985; Shepherd 1990; *Netherlands*: Wiegman et al. 1983:208 **NORTH AMERICA** *Canada*: Moyer 1992:398; *United States*: US Department of Justice 1976:7; US Department of Justice 1977:5; Curtis 1977:165; Hindelang et al. 1978:188; Balkan 1979; Gordon et al. 1980:S145; Bowker 1981:161; RJ Simon 1981:35; Empey 1982:136; US Department of Justice 1988:27; Bureau of Justice Statistics 1991:18; Reiss & Roth 1993:69; Kingery et al. 1995:341; Kachur et al. 1996; Fehon et al. 2001 (psychiatric patients) **INTERNATIONAL** *Multiple Countries*: van Dijk et al. 1991:49	**NORTH AMERICA** *United States*: SP Taylor & Epstein 1967 (college); MB Harris 1992 (college)	
No signif. difference					**NORTH AMERICA** *United States*: Bensley et al. 1999		
Females victimized more				**NORTH AMERICA** *United States*: McCabe et al. 2002 (delinquents)		**NORTH AMERICA** *United States*: Wechsberg et al. 1998 (drug addicts)	**NORTH AMERICA** *United States*: D Smith & Brewer 1992 (urban); Craven 1996; Marvell & Moody 1999; Rennison 1999 **INTERNATIONAL** *Multiple Countries:* J Gardner 1990

12.6.2.4. Being the Victim of Domestic Violence/Abuse in General

According to Table 12.6.2.4, all of the available evidence on gender differences in being the victim of domestic violence or abuse has concluded that females are more often victimized than males.

Table 12.6.2.4. Being the victim of domestic violence/abuse in general.

Nature of Any Difference	Postpubertal
	Adult
Males victimized more	
No signif. difference	
Females victimized more	**EUROPE** *Britain*: Dobash & Dobash 1992 (death) **NORTH AMERICA** *United States*: Mercy & Saltzman 1989 (death); Bograd 1990; JW White & Kowalski 1994; McCauley et al. 1995 (requiring medical treatment) **OCEANIA** *Australia*: Dal Grande et al. 2003:545

12.6.2.5. Being the Victim of Child Abuse/Neglect (Non-Sexual)

Findings pertaining to who is most often the victim of non-sexual forms of child abuse and neglect have been very inconsistent with respect to any sex difference (Table 12.6.2.5).

Table 12.6.2.5. Being the victim of abuse/neglect (non-sexual).

Nature of Any Difference	Prepubertal		Postpubertal	Multiple Age Categories
	Toddler	Childhood	Adolescent	
Males victimized more		**ASIA** *China*: So-Kum Tang 1998* **NORTH AMERICA** *United States*: MI Wilson et al. 1980* (abuse & neglect)	**OCEANIA** *Guam*: Pinhey & Millman 2004	**ASIA** *Korea*: Chun 1989:157 (from birth through adolescence)
No signif. difference				**EUROPE** *Sweden*: R Ekman et al. 2005:30 (ages 1-20, death due to violence)
Females victimized more	**ASIA** *China*: So-Kum Tang 1998* **NORTH AMERICA** *United States*: MI Wilson et al. 1980 (abuse & neglect)*		**NORTH AMERICA** *United States*: MI Wilson et al. 1980* (abuse & neglect)	

12.6.2.6. Being the Victim of Coerced/Forced Sex

Most relevant studies have concluded that females are more often than males to be the victims of coerced or forced sexual intercourse (Table 12.6.2.6). Nevertheless, one exception was reported.

Table 12.6.2.6. Being the victim of coerced/forced sex.

Nature of Any Difference	Prepubertal	Postpubertal	
	Childhood	Adolescence	Adult
Males victimized more			
No signif. difference			**NORTH AMERICA** *United States*: Chadwick & Top 1993:62 (self-report)
Females victimized more	**AFRICA** *Ghana*: Erulkar 2004:185*	**AFRICA** *Ghana*: Erulkar 2004:185* **EUROPE** *Scotland*: D Wight et al. 2000 (adolescent) **NORTH AMERICA** *United States*: KA Moore et al. 1989; SM Jackson et al. 2000	**AFRICA** *Ghana*: Erulkar 2004:185* **NORTH AMERICA** *Canada*: O'Sullivan et al. 1998; *United States*: Waldner-Haugrud & Magruder 1995; Hogben et al. 1996; O'Sullivan et al. 1998; KM Ryan 1998:384 (young); Shrier et al. 1998 (young); Larimer et al. 1999:301; Menard et al. 2003 (college); Struckman-Johnson 1988*; Struckman-Johnson et al. 2003 (coerced) **OCEANIA** *Australia*: McConaghy & Zamir 1995 (medical students, self-report)

12.6.2.7. Being the Victim of Rape/Sexual Assault

Nearly all of the available research has concluded that rape and sexual assault victims are predominantly females (Table 12.6.2.7). The distinction between coerced/forced sex (discussed above) and rape/sexual assault (discussed here) is obviously minimal and probably questionable. Nevertheless, the distinction seem to have been made in several studies, with the former being somewhat less violent and/or criminal than the latter.

Table 12.6.2.7. Being the victim of rape/sexual assault.

Nature of Any Difference	Prepubertal	Postpubertal		Multiple Age Categories
	Childhood	Adolescent	Adult	
Males victimized more				
No signif. difference		**ASIA** *China*: WCW Wong et al. 2004:473		
Females victimized more	**AFRICA** *Ghana*: Erulkar 2004:185* **NORTH AMERICA** *United States*: Cappelleri et al. 1993; McCabe et al. 2002 (among delinquents)	**AFRICA** *Ghana*: Erulkar 2004:185* **NORTH AMERICA** *United States*: ER Hall & Flannery 1984; Fehon et al. 2001 (psychiatric patients)	**AFRICA** *Ghana*: Erulkar 2004:185* **NORTH AMERICA** *United States*: Lott et al. 1982 (college); Sigelman et al. 1984:538 (college); Makepeace 1986 (young); Calderwood 1987:53 (college); Koss et al. 1987 (college); Sandberg et al. 1987 (college, by an acquaintance); Aizenman & Kelley 1988 (college, by an acquaintance); Muehlenhard & Cook 1988 (college); Struckman-Johnson 1988 (college, physically forced by an acquaintance); L Ellis et al. 1990:1210 (college); Koss 1990 (college); MB Harris 1992 (college); Frazier 1993 (emergency room patients); Laumann et al. 1994:335; N McCormick 1994; JW White & Kowalski 1994; Larimer et al. 1999:301 (college, fraternity/sorority members); Pino & Meier 1999:985; Rozee & Koss 2001; Kimerling et al. 2002:528 (persons seeking help at a rape crisis center) **OCEANIA** *Australia*: McConaghy & Zamir 1995 (medical students, self-report, attempts)	**EUROPE** *Multiple European Countries*: DL Payne et al. 1999: 29-30* **NORTH AMERICA** *United States*: DL Payne et al. 1999: 29-30*; Groth & Burgess 1980:806 (calls to police); Kaufman et al. 1980; Poppen & Segal 1988; Anonymous 1989; US Dept. of Justice 1989:297; Pino & Meier 1999:985; Sorenson & Siegel 1992:96; Frazier 1993 (physical injury sustained); Wechsberg et al. 1998 (drug addicts); Breslau et al. 1999:816

12.6.2.8. Being the Victim of Sexual Abuse

Table 12.6.2.8 indicates that females are victims of sexual abuse more than are males, a conclusion that supports a generalization reached by Nolen-Hoeksema & Girgus (1994).

Table 12.6.2.8. Being the victim of sexual abuse.

Nature of Any Difference	Prepubertal	Postpubertal		Multiple Age Categories
	Childhood	Adolescent	Adult	
Males victimized more				
No signif. difference			**NORTH AMERICA** *United States*: DM Johnson et al. 2003	
Females victimized more	**NORTH AMERICA** *United States*: J Jason et al. 1982; Brenner 1994 (self-reported in adulthood) **OCEANIA** *Australia*: G Martin et al. 2004:496	**NORTH AMERICA** *United States*: Finkelhor 1979; DD Nelson et al. 1994; Gallup International Organization 1995; PM Harrison et al. 1997; LS Bensley 1999a; LS Bensley 1999b	**NORTH AMERICA** *United States*: D Baker et al. 1998 (military) **OCEANIA** *New Zealand*: Flett et al. 2004	**EUROPE** *Germany*: Perkonigg et al. 2000 **NORTH AMERICA** *United States*: D Russell 1986 (incest); Finkelhor et al. 1990; Molnar et al. 2000

12.6.2.9. Being the Victim of Unwanted/Unwelcome Sexual Contact/Intercourse

Findings pertaining to who is most often the victim (or recipient) or unwelcomed sexual contact or intercourse have been inconsistent with respect to any sex difference (Table 12.6.2.9).

Table 12.6.2.9. Bieng the victim of unwanted/unwelcome sexaul contact/intercourse.

Nature of Any Difference	Postpubertal
	Adult
Males victimized more	**NORTH AMERICA** *United States*: Muehlenhard & Cook 1988 (college)
No signif. difference	**NORTH AMERICA** *United States*: Rouse 1988:316 (college)
Females victimized more	**NORTH AMERICA** *United States*: Larimer et al. 1999:301 (college, fraternity/sorority members)

12.6.2.10. Being the Victim of Spouse Abuse/Violence

Most research surrounding spousal abuse and violence has concluded that females are more likely than males to be the victims (Table 12.6.2.10). Seeming inconsistencies may be largely explained in terms of the severity of the abuse or violence, with females being more often the victims of the most serious forms.

Table 12.6.2.10. Being the victim of spouse abuse/violence.

Nature of Any Difference	Postpubertal	Multiple Age Categories
	Adult	
Males victimized more	**NORTH AMERICA** *United States*: Schafer et al. 1998 (self-reports, intact couples)	**NORTH AMERICA** *United States*: Gelles 1972; Straus 1986; Dobash & Dobash 1979
No signif. difference	**EUROPE** *Britain*: Home Office 1998 (self-reports) **NORTH AMERICA** *United States*: MA Straus & Gelles 1995; Straus 1999*	
Females victimized more	**EUROPE** *Britain*: Worrall & Pease 1986 (sustained more injuries) **NORTH AMERICA** *United States*: MA Straus et al. 1980 (sustain more injuries); RA Berk et al. 1983* (sustain more injuries); Langan & Innes 1986 (sustain more injuries); MD Schwartz 1987 (sustain more injuries); Stets 1990 (sustain more injuries); Cantos et al. 1994 (couples in counseling); Bachman & Saltzman 1995 (sustain physical injuries); Holtzworth-Munroe et al. 1995 (newlyweds); Tjaden & Thoennes 1998 (sustain physical injuries); Zlotnick et al. 1998 (sustain physical injuries); Straus 1999* (sustain more injuries)	**NORTH AMERICA** *United States*: RA Berk et al. 1983*; SB Sorenson et al. 1996:38 **OCEANIA** *Australia*: GL Roberts et al. 1993 (hospital visits)

12.7
PORTRAYALS IN COVERAGE BY THE MASS MEDIA

Portrayals in the mass media are based on a content analysis. Such a methodology involves having one or more raters count the number of instances that males and females are portrayed in a particular way.

12.7.1. Portrayals Concerning Demographic Characteristics

A number of studies have sought to document gender differences in the extent to which persons are portrayed in the mass media. The tables in this sub-section have to do with the demographic characteristics of those being portrayed.

12.7.1.1. Sex of Individuals Portrayed in the Mass Media in General

Numerous studies have sought to determine which sex is most often portrayed in the mass media in featured roles (as opposed to less-central roles). As shown in Table 12.7.1.1, nearly all of these studies have determined that males are portrayed more often than females, a conclusion also reached by two literature reviews (Calvert & Huston 1987; Glascock 2001). In the United States, since relevant data first began to be compiled in the 1970s, the overall ratio has remained about two males portrayed for every one female (Glascock 2001:657).

Table 12.7.1.1. Sex of individuals portrayed in the mass media in general.

Nature of Any Difference	Prepubertal	Postpubertal	Multiple Age Categories
	Childhood	Adult	
Males portrayed more	**NORTH AMERICA** *United States*: Weitzman et al. 1972; Bekkedal 1973 (fiction for children, main characters); Sternglanz & Serbin 1974 (children's TV programs); Marten & Matlin 1976:765 (children's readers, main characters); Barcus 1983 (children's TV); AJ Davis 1984 (children's readers, main characters); JA Williams et al. 1987 (children's readers, main characters); SM McDonald 1989 (children's readers, main character); DM Davis 1990 (TV); SB Peterson & Lach 1990 (children's readers, main characters); Kortenhaus & Demarest 1993 (children's readers, main characters)	**NORTH AMERICA** *United States*: A Courtney & Lockeretz 1971 (in the paid work force/portrayed in magazines); S Miller 1975 (in newspapers); D Archer et al. 1983 (news magazines); DeLouth et al. 1995 (newspaper photos)	**NORTH AMERICA** *United States*: Graebner 1972 (novels, main characters); Tedesco 1974 (TV); McNeil 1975 (TV); McArthur & Eisen 1976 (TV); Tuchman et al. 1978:28 (TV drama); JR Dominick 1979 (TV); BS Greenberg 1980 (TV); Signorielli 1989 (TV); Lauzen & Dozier 1999 (TV); C Douglas et al. 2002; Signorielli 1993; Elasmar et al. 1999 (TV)
No signif. difference	**NORTH AMERICA** *United States*: H White 1986 (children's readers, main characters, peripheral characters)		**ASIA** *Hong Kong*: A Furnham & Chan 2003
Females portrayed more	**NORTH AMERICA** *United States*: Baskin & Harris 1977 (children's books, main characters, ill or disabled); Saad 1999 (children's books, main characters, ill or disabled)		**AFRICA** *Kenya*: Mwangi 1996 (TV commercials) **ASIA** *Hong Kong*: Furnham et al. 2000 (TV commercials) **EUROPE** *Britain*: Manstead & McCulloch 1981 (TV commercials)

12.7.1.2. Sex of Individuals Featured in Cartoons and Video Games

All studies of the sex of individuals featured in cartoons and video games have concluded that males are used more than females (Table 12.7.1.2).

Table 12.7.1.2. Sex of individuals featured in cartoons and video games.

Nature of Any Difference					Multiple Age Categories
Males more					**NORTH AMERICA** *United States*: Busby 1974 (cartoons); O'Kelly 1974 (cartoons); Streicher 1974 (cartoons); Levinson 1975 (cartoons); C Leaper et al. 2002:1658 (cartoons); Provenzo 1991 (video game characters); Deitz 1998 (video game characters)
No signif. difference					
Females more					

12.7.1.3. Sex of Individuals Featured in Television and Magazine Commercials in General

Research concerning which sex is most often featured in television and magazine commercials has reached inconsistent conclusions (Table 12.7.1.3).

Table 12.7.1.3. Sex of individuals featured in television and magazine commercials.

Nature of Any Difference							Multiple Age Categories
Males more							**MIDDLE EAST** *Israel*: First 1998:1075* (TV commercials in 1979) **NORTH AMERICA** *United States*: SN Davis 2003 (TV commercials)
No signif. difference							**MIDDLE EAST** *Israel*: First 1998:1075* (TV commercials in 1994) **NORTH AMERICA** *United States*: Bretl & Cantor 1988 (TV commercials); Lovdal 1989 (TV commercials)
Females more							**ASIA** *Japan*: Arima 2000 (TV commercials) **NORTH AMERICA** *United States*: D Archer et al. 1983 (magazine covers); Nigro et al. 1988 (magazine ads)

12.7.1.4. Sex of Individuals Featured in TV and Magazine Commercials Involving Housework

All of the studies that were located pertaining to which gender was most often portrayed performing housework concluded that females outnumbered males (Table 12.7.1.4).

Table 12.7.1.4. Sex of individuals featured in television and magazine commercials.

Nature of Any Difference	Prepubertal				Postpubertal		Multiple Age Categories
				Childhood	Adolescent		
Males more							
No signif. difference							
Females more				**NORTH AMERICA** *United States*: AL Smith 1994* (TV commercials)	**NORTH AMERICA** *United States*: AL Smith 1994* (TV commercials)		**AFRICA** *South Africa*: Furnham & Spencer-Bowdage 2002* (TV commercials) **ASIA** *Japan*: Arima 2000 (TV commercials) **EUROPE** *Britain*: Furnham & Spencer-Bowdage 2002* (TV commercials)

12.7.1.5. Sex of Individuals Used as Voice-Overs in Television Commercials

All studies of the use of voice-overs in television commercials have concluded that male voices are more often used than female voices (Table 12.7.1.5).

Table 12.7.1.5. Sex of individuals used as voice-overs in television commercials.

Nature of Any Difference							Multiple Age Categories
Males more							**ASIA** *Hong Kong*: Furnham & Chan 2003; *Indonesia*: Furnhan et al. 2000; *Japan*: Sakamoto et al. 1999 **NORTH AMERICA** *United States*: Culley & Bennett 1976; Tuchman 1978
No signif. difference							
Females more							

12.7.1.6. Age of Individuals Portrayed in the Mass Media

Studies have consistently found that the average age of males who are portrayed or featured in all forms of mass media presentations are older than in the case of females (Table 12.7.1.6).

Table 12.7.1.6. Age of individuals portrayed in the mass media.

Nature of Any Difference						Postpubertal	Multiple Age Categories
						Adult	
Males older						**NORTH AMERICA** *United States*: E Levy 1989 (top box office drawing actors); Markson & Taylor 1993 (Oscar winners); Schatz 1997:363 (major film stars); Gilberg & Hines 2000 (Oscar winners); Lincoln & Allen 2004 (actors)	**NORTH AMERICA** *United States*: Dominick & Rauch 1972 (in commercials); Culley & Bennett 1976 (in commercials); Schneider & Schneider 1979 (in commercials); BS Greenberg 1980 (on television); DM Davis 1990 (television); Signorielli 1993; Glascock 2001:664 (on television)
No signif. difference							
Females older							

12.8.2. Portrayals Concerning an Individual's Characteristics

In the following subsection, studies are reviewed that have to do with how people are portrayed differently depending on their sex.

12.8.2.1. Portrayals of Dominance and Status-Related Behavior in the Mass Media

Research undertaken to determine if males or females are more likely to be portrayed in dominant roles or as exhibiting dominating behavior have concluded that such portrayals are more characteristic of males than of females (Table 12.8.2.1).

Table 12.8.2.1. Portrayals of dominance and status-related behavior in the mass media.

Nature of Any Difference							Multiple Age Categories
Males more							**ASIA** *Japan*: Rolandelli 1991 (on TV) **EUROPE** *Britain*: M Macdonald 1985 **MIDDLE EAST** *Israel*: First 1998:1074 (in social control) **NORTH AMERICA** *United States*: Gerbner & Signorielli 1979; BS Greenberg 1980; M Morgan 1982; M Morgan 1987; Signorielli 1989; SJ Douglas 1994
No signif. difference							
Females more							

12.8.2.2. Sex Roles and Occupational Portrayals in Mass Media Other Than TV Commercials

Studies that have been undertaken to determine if males are more often than females depicted as performing traditionally (or stereotypically) masculine rather than feminine roles have all concluded that they are (Table 12.8.2.2).

Table 12.8.2.2. Sex roles and occupational portrayals in the mass media other than TV commercials.

Nature of Any Difference	Prepubertal				Postpubertal		Multiple Age Categories
				Childhood		Adult	
Males portrayed in more masculine or less feminine roles & occupations				**ASIA** *China*: W Wang 1998 **OCEANIA** *Philippines*: Lamug 1997		**AFRICA** *Zimbabwe*: A Furnham et al. 2001 **ASIA** *China*: C Hong 1997; *Hong Kong*: Furnham & Chan 2003* (breadwinners); *Japan*: Sakamoto et al. 1999* (breadwinners) **EUROPE** *Britain*: Manstead & McCulloch 1981; A Furnham & Bitar 1993* (in charge of businesses); M. Skoric & Furnham 2003* (in charge of businesses); *Italy*: Furnham & Voli 1989; *Portugal*: Neto & Pinto 1998* (breadwinners); *Serbia*: M Skoric & Furnham 2003* (in charge of businesses) **NORTH AMERICA** *United States*: LA McArther &Resko 1975; Coltrane & Adams 1997; C Hong 1997; Signorielli 1997; Glascock 2001:664 (business owners & supervisors); SR Stern & Mastro 2004 **INTERNATIONAL** *Multiple Countries*: A Furnham et al. 2000; A Furnham & Imadzu 2002	**MIDDLE EAST** *India*: Das 2000 (magazine) **NORTH AMERICA** *United States*: Dominick & Rauch 1972; LZ McArther & Resko 1975; Elena 1993 (scientists); L Smith 1994 (commercials); TL Thompson & Zerbinos 1995 (cartoons)
No signif. difference							
Females portrayed in more masculine or less feminine roles & occupations							

12.8.2.3. Portrayals of Working Outside the Home in Television Commercials

Several studies have sought to determine the nature of gender differences in occupational portrayals in television commercials. As shown in Table 12.8.2.3, these studies have all concluded that males are more often portrayed as having an occupation outside the home, and as having a wider range of such occupations, than was true for females.

Table 12.8.2.3. Portrayals of working outside the home in television commercials.

Nature of Any Difference					Postpubertal		Multiple Age Categories
						Adult	
Males more						**ASIA** *Japan*: Nobushima 1998 (with an occupation); Arima 2003 (with an occupation) **NORTH AMERICA** *United States*: Bretl & Cantor 1988 (with an occupation)	**ASIA** *China*: Cheng 1997 (with an occupation) **NORTH AMERICA** *United States*: Dominick & Rauch 1972 (in a wider range of occupations; business settings); Courtney & Whipple 1974 (away from home); Culley & Bennett 1976 (in a wider range of occupations); Schneider & Schneider 1979 (in a wider range of occupations); Knill et al. 1981 (in a wider range of occupations); Bretl & Cantor 1988 (higher status occupations); Craig 1992 (higher status); K Allan & Coltrane 1996 (higher status occupations); Coltrane & Adams 1997 (higher status); SN Davis 2003 (at work)
No signif. difference							
Females more							

12.8.2.4. Portrayals of Working Inside the Home in Television Commercials

Studies have very consistently shown that females are more likely than males to be portrayed in television commercials as working inside the home, taking care of children, or performing other household duties (Table 12.8.2.4).

Table 12.8.2.4. Portrayals of working inside the home in television commercials.

Nature of Any Difference	Prepubertal	Postpubertal	
	Childhood	Adolescent	Adult
Males more			
No signif. difference			
Females more	**NORTH AMERICA** *United States*: AL Smith 1994* (involved in housework)	**NORTH AMERICA** *United States*: AL Smith 1994* (involved in housework)	**AFRICA** *South Africa*: Furnham & Spencer-Bowdage 2002* (doing housework) **EUROPE** *Britain*: Furnham & Bitar 1993 (homemakers); RA Jones 1997 (scientists)**;** Furnham & Spencer-Bowdage 2002* (doing housework) **NORTH AMERICA** *United States*: Dominick & Rauch 1972* (in a domestic role); Courtney & Whipple 1974* (in the home, domestic role); LZ McArther & Resko 1975 (in the home); Culley & Bennett 1976* (in a domestic role); O'Donnell & O'Donnell 1978 (in the home); Schneider & Schneider 1979* (in a domestic role); Lovdal 1989 (in the home); Craig 1992* (homemakers); Allan & Coltrane 1996* (in the home); Brabant & Mooney 1997 (domestic role); Coltrane & Adams 1997* (homemakers); SN Davis 2003* (in the home)

12.8.2.5. Portrayals of Fearfulness and Shyness in the Mass Media

Studies undertaken to determine if males or females are more likely to be portrayed as fearful or shy have concluded that females are so portrayed more often than males (Table 12.8.2.5).

Table 12.8.2.5. Portrayals of fearfulness and shyness in the mass media.

Nature of Any Difference	Multiple Age Categories
Males more	
No signif. difference	
Females more	**NORTH AMERICA** *United States*: C Leaper et al. 2002:1658 (cartoon characters, fearful) **MIDDLE EAST** *Israel*: First 1998:1074 (TV ads, shy)

12.8.2.6. Portrayals of Physical Attractiveness and Sexiness in the Mass Media

According to the few available studies, females are more likely than males to be portrayed in the mass media as physically attractive or sexy (Table 12.8.2.6).

Table 12.8.2.6. Portrayals of physical attractiveness and sexiness in the mass media.

Nature of Any Difference	Multiple Age Categories
Males more	
No signif. difference	
Females more	**NORTH AMERICA** *United States*: Archer et al. 1983 (sexual); Soley & Kurzbard 1986 (sexual, magazine ads); Sommers-Flanagan et al. 1993 (sexual, TV programs); C Leaper et al. 2002:1658 (cartoon, exhibiting "romantic behavior")

12.8.2.7. Portrayals of Physical Violence and Aggression in the Mass Media

Several content analysis studies have sought to determine if males or females are more likely to be portrayed as exhibiting physical aggression and violence. These studies have all concluded that male characters are more likely than female characters to be portrayed as physically aggressive and violent (Table 12.8.2.7).

Table 12.8.2.7. Portrayals of physical violence and aggression in the mass media.

Nature of Any Difference	Prepubertal				Postpubertal		Multiple Age Categories
			Early Childhood		Adolescent	Adult	
Males more			**NORTH AMERICA** *United States*: Tout et al. 1998:1255		**NORTH AMERICA** *United States*: Felson 1996	**ASIA** *Japan*: Rolandelli 1991 (TV)	**NORTH AMERICA** *United States*: Sternglanz & Serbin 1974 (children's TV); Streicher 1974 (cartoon); Tedesco 1974; McArthur & Eisen 1976 (TV); Norland & Shover 1977 (TV); BS Greenberg 1980 (TV); Signorielli 1989 (TV); Turow 1986 (TV); Sommers-Flanagan et al. 1993 (TV); TL Thompson & Zerbinos 1995 (cartoon); Glascock 2001:665 (TV); C Leaper et al. 2002:1658 (cartoon)
No signif. difference							
Females more							

12.8.2.8. Portrayals Concerning Politeness in the Mass Media

A content analysis of cartoons concluded that female characters were more likely than male characters to be portrayed as being polite (Table 12.8.2.8).

Table 12.8.2.8. Portrayals concerning politeness in the mass media.

Nature of Any Difference							Multiple Age Categories
Males more							
No signif. difference							
Females more							**NORTH AMERICA** *United States*: C Leaper et al. 2002:1658 (cartoon)

12.8.2.9. Portrayals of Being a Victim in the Mass Media

Two studies of cartoons sought to determine if male or female characteris were more likely portrayed as the victims of violence. These studies reached contradictory conclusions (Table 12.8.2.9).

Table 12.8.2.9. Portrayals of being a victim in the mass media.

Nature of Any Difference							Multiple Age Categories
Males more							**NORTH AMERICA** *United States*: C Leaper et al. 2002:1658 (in cartoons)
No signif. difference							
Females more							**NORTH AMERICA** *United States*: Sommers-Flanagan et al. 1993

12.8.3. Coverage in the Mass Media

The findings on coverage given by the mass media to males and females are presented in the following two tables.

12.8.3.1. Sports Coverage According to Sex of Players

According to the available evidence, sporting activities by males receive more coverage than do such activities by females (Table 12.8.3.1).

Table 12.8.3.1. Sports coverage according to sex of players.

Nature of Any Difference					Postpubertal		Multiple Age Categories
						Adult	
Males more						**NORTH AMERICA** *United States*: Bate 1987 (newscasts); M Sage & Furst 1994; Yang 1996 (newscasts); Wann 1998 (college); Zoch & VanSlyke Turk 1998 (newscasts); JR Hallmark & Armstrong 1999; Cl Armstrong 2004 (newspapers)	**EUROPE** *Britain*: Alexander 1994; *Sweden*: Koivula 1999 (86% vs. 12%) **NORTH AMERICA** *United States*: Tuggle 1997; Kachgal 2001; Adams & Tuggle 2004
No signif. difference							
Females more							

12.8.3.2. Coverage of Violence Victimization in the Mass Media

News coverage of persons who were the victims of violence has been subjected to content analysis in a few studies to determine if a sex difference is detectable. As shown in Table 12.8.3.2, the studies have concluded that male victimization has received more coverage than has female victimization.

Table 12.8.3.2. Coverage of violence victimization in the mass media.

Nature of Any Difference						Multiple Age Categories
Males more						**NORTH AMERICA** *United States*: Cavender et al. 1999 (on reality TV programs); Cavender et al. 1999 (in TV interviews)
No signif. difference						
Females more						

Chapter 13

THE GRAND SUMMARY

This book can be thought of as providing an aerial view of a vast terrain: sex differences in almost everything! Even though new studies are appearing daily and existing studies are coming to our attention frequently, no findings of sex differences were intentionally omitted. The over 18,000 studies whose results were organized into the nearly 1,900 tables of this book represent the most comprehensive attempt to characterize what is known about how males and females differ (or fail to do so) yet assembled.

In assessing both the triumphs and shortcomings of our effort, it is important to note that as with any high-altitude overview, many details – some potentially important – will not be visible. Therefore, readers are encouraged to return to the original documents when fine grained scrutiny of any specific sex difference is undertaken. Also, mistakes are bound to have been made in interpreting research findings or in terms of sometimes categorizing them into their most appropriate tables. Readers are asked to notify us of any such mistakes so that future editions of the book can be corrected (www.scienceinfosearch.com).

Drawing away from the details even further, this final chapter will characterize the current state of scientific knowledge regarding male-female differences for traits that have been extensively researched. By "extensively researched" we mean tables for traits identified in Chapters 1 through 12 that contain at least ten citations to studies of humans. This ten-citation criterion is explained more below.

13.1

TOWARD IDENTIFYING UNIVERSAL SEX DIFFERENCES

Especially when it comes to behavior, a number of writers have asserted that men and women tend to be so different from one another that they can be thought of as belonging to different cultures (Maltz & Borker 1982; Tannen 1990; J Gray 1992; Noller 1993; JT Wood & Inman 1993). Critics have called this *Different Cultures Thesis* (*DCT*) an exaggeration and point out that sex differences are usually minimal-to-modest and quite tenuous over time (R Barnett & Rivers 2004; MacGeorge et al. 2004; Burleson et al. 2006).

Settling the DCT controversy may be impossible, but it comes close to a question that helped to guide the assembly and writing of this book: *To what extent are there any human traits in which sex differences are universal across cultures and consistent over time?* A brief history of sex difference research, particularly in the social sciences, will provide a platform on which to build this final chapter.

13.1.1. A Brief History of Sex Difference Research Especially Regarding Behavior

The first scientific study of human sex differences is lost in antiquity, but, given how obvious questions about sex differences are to anyone studying animals who sexually reproduce, it must have been written early in the history of the biological and social sciences. As research pertaining to sex differences accumulated, the publication of summaries of these studies began to appear. Some of the earliest reviews of scientific findings on the nature of sex differences in behavior go back to the early part of the 20th Century (Woolley 1914; Hollingworth 1918; CN Allen 1927).

A particularly influential summary was contained in a book written by Eleanor Maccoby and Carol Jacklin (1974), entitled *The Psychology of Sex Differences*. This book amassed the findings from approximately 2,000 studies, an unprecedented feat for its day. From this broad-ranging compilation of findings, Maccoby and Jacklin identified only four traits that seemed to exhibit consistent cross-cultural gender differences: verbal ability (especially before puberty), math ability (especially after puberty), visual-spatial ability, and physical offensive aggression.

A couple of years after Maccoby and Jacklin's (1974) book was published, Gene Glass (1976) published the first article a new type of procedure was used for drawing together findings from numerous studies on a specific topic. He called this set of procedures a *meta-analysis*. It basically converts individual studies of a given issue to a single statistic that is weighted according to each study's sample size. This allows researchers to look for an overall pattern of findings that is much less affected by sample size limitations than is true for each of the individual studies incorporated into the meta-analysis.

No single type of relationship has received more meta-analysis attention than sex differences in behavior (Ellis 1993:156). This is due to the vastness of research available on sex differences, and because meta-analyses are most easily performed when the variables being studies are all measured and calibrated in essentially the same way (something that is truer for sex than for just about any other biological variable). Since the advent of meta-analysis methodology, literally hundreds of meta-analyses pertaining to sex differences in behavior have been published, many of which were recently reviewed by Janet Hyde (2005).

The present book shares essential features of conventional meta-analysis, but deviates from it in two important ways. First, unlike the type of meta-analysis developed by Glass (1976), this book did not convert findings from each study to a common statistic. Second, the findings reflected in this book treat each published study as a "vote" for a particular sex difference, regardless of the sample size utilized in each study. As explained below, this approach has advantages and disadvantages.

13.1.2. The Vote-Counting Meta-Analysis Methodology

A meta-analysis is an overarching "study of studies." Most conventional meta-analyses convert findings from individual studies of a particular topic to a common statistic and then make adjustments for each study's sample size. This procedure yields a final estimate of the ultimate finding expressed in terms of an effect size, which can be thought of as an estimate of the "real" population difference between groups (e.g., males and females) for the trait under study.

Among the disadvantages of this type of meta-analysis is that it obscures any cross-cultural and temporal patterns that might exist in a trait under investigation. In other words, combining all available studies into a single subject pool makes it impossible to detect trends or cultural differences. Also, many meta-analyses consolidate findings from studies derived from subjects whose ages may be quite different, thereby further obscuring potentially important variations.

By not combining findings from individual studies into a single statistic, the present book's vote-counting meta-analysis procedure allows researchers to look for differences across cultures, age groups, and time periods. It will also make the updating of tables with the results of new findings much simpler than in the case of the effect size type of meta-analysis.

13.1.2.1. The Basic Logic of the Vote-Counting Meta-Analysis

This concluding chapter will provide a condensed grand summary of the findings from the scientific research on repeatedly investigated sex differences. To qualify as "repeatedly investigated," we stipulated that at least ten studies of human subjects pertainant to a given sex difference had to have been published. Studies of other animals are not considered in this final chapter. While our methodology fits within the spirit of a meta-analysis, it treats each study of a given sex difference with equal weight (rather than making adjustments for differential sample sizes and for the magnitude of a sex difference within each study). In the present vote-counting methodology, any study that found a statistically significant sex difference is so reported.

As explained in the Preface, all tables containing citations to 10 or more studies of humans were used to calculate both a consistency index (CI) and a diversity index (DI). The CI provides an estimate of how well findings from the available studies internally agree, and the DI indicates the extent to which numerous cultures were a part of the CI score.

While there are parallels, one should not think of these indexes as effect sizes in a conventional meta-analysis. The CI and DI cannot be used to provide an estimate of a trait's overall degree of sex difference. However, the present vote-counting method is actually better for answering related questions: To what extent is a particular sex difference culturally universal or invariant across time and age groups?

13.1.2.2. The Utility of the Vote-Counting Meta-Analysis: Sex Differences in Pain Tolerance, Dominance, and Aggression

To illustrate the value of the vote-counting type of meta-analysis, consider the topic of sex differences in pain tolerance. The numbers and types of studies addressing this topic are impressively large. Many of the studies pertain to naturally-occurring pain for which one would seek medical treatment (Table 3.3.2.1) while many others come from experiments in which some pain-inducing apparatus is utilized (Table 4.2.1.1 and Table 4.2.1.2). Most studies cited in these two tables concluded that females are more sensitive to pain than are males. In like manner, the overwhelming majority of studies have found males tolerating more intense pain than females tolerate under identical testing conditions (Table 4.2.1.3).

Why would such a sex difference be found? Morey and Zhu (2003:382) recently proposed that "In this country [the United States], men are socialized to ignore pain and discomfort, and women are socialized to acknowledge pain and discomfort." This explanation seems inadequate in light of the evidence provided in all three of the above tables that the sex differences in pain sensitivity and tolerance are not unique to the United States.

The Morey-Zhu explanation also encounters difficulties when findings from studies of stereotypes are examined, since most studies found that women were thought by both sexes to be *more* able to tolerate pain than males (Table 12.1.1.84). Clearly, such a simple socialization explanation for greater pain sensitivity in females and greater pain tolerance in males fails to account for the totality of the current evidence.

Additional refutation comes from studies of nonhuman animals. Table 4.2.1.3 shows that most studies of rats have also found greater pain tolerance among males than among females. This evidence plus the apparent universality of the same sex difference in humans clearly leads one to suspect that biological factors are operating.

Another instance in which information summarized in this book can advance scientific understanding of sex differences involves the work of the famous anthropologist, Margaret Mead. In the 1930s, Mead (1935/1950:210) referred to "the European tradition of male dominance" and focused her book on providing an account of a female-dominated society that was beyond the realm of Western influence. Over seventy years later, we can look at her conclusion in the context of numerous replications, and partial replications of her research. Table 11.1.1.1 identifies 39 studies of sex differences in dominance among adolescents and adults. Using a variety of operational measures, all but three of these studies conclude that male dominance exceeds that of females. The exceptions: Two simply failed to conclude that the differences were statistically significant (both conducted in the United States), while the other study found females to be more dominant than males. This latter study was the one reported by Mead herself, in which she asserted that females were dominant over males, putting it at odds with the vast majority of other studies, suggesting that her lone observation was erronious.

In the same book, Mead (1935/1950:213) discussed sex differences in attitudes toward war. She wrote, "This belief that women are naturally more interested in peace is undoubtedly artificial, part of the whole mythology that considers women to be gentler than men." Is Mead correct in characterizing women's greater gentleness a myth? Information summarized in the present book casts serious doubt on the wisdom of her assertion. Some of the evidence comes from Table 6.2.3.11 on attitudes toward the use of aggressive responses to conflict. All 23 studies found that women prefer less aggressive responses to disputes than do men. Turning to actual behavior, Table 9.5.1.18a provides additional evidence of greater female gentleness. In 70 out of 73 studies, males were found to engage in rough-and-tumble play more than females (and a similar pattern is also evident among most other mammals – Tables 9.5.1.18b & 9.5.1.18c). Also, the vast majority of studies of offensive aggression indicate that males predominate in such behavior (Tables 9.6.1.1). Furthermore, nearly all of the studies of violent crime have concluded that males are the primary offenders (Table 10.2.2.5). These sex differences have been documented in many parts of the world, making it increasingly difficult to justify labelling the assertion that "women are the gentler sex" a myth. The evidence suggests that there really *are* universal sex differences in gentleness.

13.2
SUMMARIZING TABLES CONTAINING TEN OR MORE CITATIONS

In this section, a large number of *grand tables* will be presented. These tables will summarize all of the tables appearing in the twelve preceding chapters wherein ten or more citations to studies of humans appear. Each grand table consists of seven columns, the headers for which are as follows:

- Variable name
- Number for the pertinent table (as identified in Chapters 1-12)
- Number of human studies cited in each table
- Consistency score (CI)
- Diversity score (DI)
- Time range covered by the available studies
- Generalization derived from the current evidence

As already mentioned, consistency scores reflect the extent to which ten or more studies of humans were consistent in indicating a specific sex difference (i.e., males more, females more, or no significant sex difference) for a given characteristic. Diversity scores largely indicate the number of countries in which studies of a particular trait have been conducted. For the details on how the CIs and DIs were calculated, see the Preface. Throughout the grand tables, readers will find traits in **bold** whenever their consistency scores are .9000 or higher.

13.2.1. Sex Differences in Basic Biological Factors (Chapter 1)

Grand Table 13.2.1 is divided into two parts that collectively reveal five sex differences that are likely to be univeral. Three traits involve basic morphology while the others are of a less obvious nature.

13.2.1a. Sex Differences in Morphology

According to Grand Split-Table 13.2.1a, males weigh more at birth and have greater muscle strength as well as a more muscular body build. Females, on the other hand, have a greater proportion of body fat.

Grand Split-Table 13.2.1a. Generalizations from tables in Chapter 1 containing ten or more studies of sex differences in humans.

Variable Name	Table Number	# Studies	Consist. Score	Diversity Score	Time Range	Generalization
Sex ratio at birth	1.1.1.3a	212	.835	58 (13+)	17th Century. to 2005	Males are usually born in higher numbers
Prenatal death	1.1.2.4	47	.447	13	1875 to 2000	No established sex difference
Birth weight	**1.1.3.2**	**27**	**1.000**	**12**	**1881 to 2004**	**Males are heavier at birth**
Physical maturation rate following birth	1.1.5.2	23	.879	5	1920 to 2003	Females usually mature faster
Prepubertal height	1.2.1.1a	46	.370	20	1872 to 2003	No established sex difference
Height in early adolescence	1.2.1.1b	33	.485	16	1881 to 2004	No established sex difference
Height following late adolescence	**1.2.1.1c**	**133**	**1.000**	**47 (4+)**	**1872 to 2005**	**Males taller following late adolescence**
Sitting height (length of trunk)	1.2.1.3	14	.357	11	1885 to 2003	No established sex difference
Prepubertal weight	1.2.1.5a	37	.622	17	1893 to 2003	Prepubertal males possibly weigh more
Postpubertal weight	1.2.1.5b	64	.703	22	1893 to 2005	Postpubertal males probably weigh more
Body mass index	1.2.3.1	60	.100	23	1977 to 2005	No established sex difference
Overweight	1.2.3.2	54	.167	22	1960 to 2004	No established sex difference
Obesity	1.2.3.3	29	.586	18	1981 to 2004	No established sex difference
Percent body fat & skinfold thickness	**1.2.3.6**	**39**	**.949**	**39 (1+)**	**1950 to 2005**	**Females have more body fat**
Waist-to-hip ratio	1.2.3.10	14	.857	8	1993 to 2004	Males have a higher waist-to-hip ratio
Size of muscles/muscle mass	1.2.5.1	19	.895	6	1957 to 2005	Males probably have more muscle mass
Muscle strength	**1.2.5.3**	**31**	**1.000**	**10**	**1902 to 2005**	**Males have greater strength**
Muscular body build (mesomorphy)	**1.2.5.4**	**12**	**.917**	**4**	**1943 to 1985**	**Males have a more muscular body build**

13.2.1b. Sex Differences in Morphology

Grand Split-Table 13.2.1b shows that males have a more pronounced 2D:4D finger ratio, denser bones, darker skin, and a larger larynx relative to females. Females, on the other hand, have greater joint laxity than do males.

Grand Split-Table 13.2.1b. Generalizations from tables in Chapter 1 containing ten or more studies of sex differences in humans.

Variable Name	Table Number	# Studies	Consist. Score	Diversity Score	Time Range	Generalization
Galvanic skin response	1.2.6.2	10	.600	5	1965 to 2003	Females possibly have a higher GSR
2D:4D ratio	**1.2.6.5**	**14**	**1.000**	**9 (1+)**	**1875 to 2003**	**Males have a larger 2D:4D ratio**
Bone density/bone mass	**1.3.2.1**	**41**	**.902**	**10**	**1981 to 2005**	**Males have greater bone density**
Joint laxity	**1.3.2.6**	**10**	**1.000**	**6**	**1973 to 2003**	**Females have a higher joint laxity**
Skin darkness (melanin index)	**1.3.3.1**	**39**	**.974**	**22 (2+)**	**1914 to 2002**	**Males have darker skin**
Larynx, vocal cords/tracks, size of	**1.3.4.7**	**19**	**1.000**	**3**	**1945 to 2001**	**Postpubertal males have larger larynxes**
Blood pressure in general	1.4.1.2	20	.250	10	1923 to 2002	No established sex difference
Diastolic blood pressure	1.4.1.8	12	.167	6	1959 to 2004	No established sex difference
Systolic blood pressure	1.4.1.9	12	.167	7	1972 to 2004	No established sex difference
Heart rate in general	1.4.1.11	30	.567	9	1887 to 2004	No established sex difference
QT intervals	1.4.1.14	17	.882	4	1989 to 2002	Females may have longer QT intervals
Gastric emptying/bowel movement ease	1.5.1.2	12	.750	6	1987 to 2003	Males may have greater ease of gastric emptying

13.2.2. Sex Differences in the Brain and Biochemistry (Chapter 2)

Chapter 2 deals with sex differences in the brain and biochemistry. Tables throughout Chapter 2 containing ten or more citations to studies of humans are summarized below in three grand split-tables.

13.2.2a. Sex Differences in the Brain Other Than Laterality

According to Grand Split-Table 13.2.2a, three nearly certain universal sex differences involving the brain have been identified to date. One indicates that both the head circumference and the cranial capacity of males surpass those of females. Another reveals that male brain size is greater than that of females. Also, the neocortex (cerebrum) of males exceeds that of females.

Grand Split-Table 13.2.2a. Generalizations from tables in Chapter 2 containing ten or more studies of sex differences in humans.

Variable Name	Table Number	# Studies	Consist. Score	Diversity Score	Time Range	Generalization
Head circumference and cranial capacity	**2.1.1.1**	**13**	**1.000**	**3**	**1987 to 2001**	**Males have a larger head circumference & cranial capacity**
Brain size/brain weight	**2.1.1.2**	**36**	**.917**	**7**	**1908 to 2005**	**Male brains appear to be larger**
Ratio of gray-to-white matter	2.1.1.5	15	.867	4	1987 to 2005	Males probably have a larger gray-to-white matter ratio
Neocortex (cerebrum) in general, size of	**2.1.2.1**	**14**	**.929**	**2**	**1979 to 2002**	**Males appear to have a larger neocortex (cerebrum)**
Corpus callosum size	2.1.3.4	18	.667	4	1982 to 2004	Females possibly have a larger corpus callosum
Hypothalamus as a whole or minor subregions, size of	2.1.5.1	10	.700	4	1989 to 2001	Males probably have a larger hypothalamus

13.2.2b. Sex Differences in Brain Laterality

Grand Split-Table 13.2.2b identifies no sex differences in the laterality of the brain with a consistency score of .9000. Nevertheless, one comes close to a .9000 consistency score regarding males having males having a greater tendency toward hemispheric specialization than is true for females.

Grand Split-Table 13.2.2b. Generalizations from tables in Chapter 2 containing ten or more studies of sex differences in humans.

Variable Name	Table Number	# Studies	Consist. Score	Diversity Score	Time Range	Generalization
Hemispheric specialization (asymmetry in neocortical functioning)	2.3.3.1	50	.860	9	1972 to 2004	Males probably have greater hemispheric specialization
Right hemispheric brain activity/activation	2.3.3.4	14	.286	3	1981 to 2005	No established sex difference
Left hemispheric brain activity/activation	2.3.3.5	21	.238	6	1981 to 2003	No established sex difference
Right hemispheric lateralization in identifying emotional expressions	2.3.3.8	47	.553	2	1923 to 1989	Females possibly have greater right hemispheric lateralization in identifying emotional expressions
Cerebral blood flow	2.4.1.3	15	.533	3	1979 to 2000	Females possibly have greater cerebral blood flow

13.2.2c. Sex Differences in Biochemistry

Regarding biochemistry, Grand Split-Table 13.2.2c identifies only one universal sex difference. It involved leptin, levels of which are higher in females than in males. It is interesting to note that even though testosterone is considered a “male sex hormone”, the consistency score for this hormone concerning a sex difference is only .767.

Grand Split-Table 13.2.2c. Generalizations from tables in Chapter 2 containing ten or more studies of sex differences in humans.

Variable Name	Table Number	# Studies	Consist. Score	Diversity Score	Time Range	Generalization
Testosterone	2.5.1.11	30	.767	10	1966 to 2003	Males probably have higher testosterone levels, esp. following puberty
Cortisol	2.5.2.3	20	.300	7	1974 to 2005	No established sex difference
Leptin	**2.9.1.9**	**39**	**1.000**	**8**	**1995 to 2004**	**Females have higher leptin levels**
Cholesterol levels in general	2.9.2.2	25	.120	8	1974 to 2002	No established sex difference
Cholesterol, high density levels	2.9.2.3	17	.706	7	1984 to 2004	Females probably have higher HDL cholesterol
Cholesterol, low density levels	2.9.2.4	15	.400	5	1986 to 2004	No established sex difference

13.2.3. Sex Differences in Health and Illness (Chapter 3)

Because of the sizable number of findings from Chapter 3 containing 10 or more citations, four grand split-tables are presented below. The first pertains to sex differences in overall indicators of health and illness. The second split-table has to do with trauma, cancer, and heart disease. In the third, one finds information on a variety of other specific illnesses, while the fourth split-table is concerned with fairly minor types of ailments.

13.2.3a. Sex Differences in Overall Health and Illness

Among the overall health and illness indicators listed in Grand Split-Table 12.2.3a, a universal sex difference was apparent in only one: Females tend to seek health care services and advice more so than males.

Grand Split-Table 13.2.3a. Generalizations from tables in Chapter 3 containing ten or more studies of sex differences in humans.

Variable Name	Table Number	# Studies	Consist. Score	Diversity Score	Time Range	Generalization
Morbidity (ill health) in general	3.1.1.1	18	.167	6	1929 to 2004	No established sex difference
Sickness/disability days (excluding pregnancy related factors)	3.1.1.2	46	.783	10	1948 to 2005	Females probably have more sickness/disability days
Seeking/utilizing health care services or advice in general	**3.1.1.3**	**25**	**1.000**	**6**	**1961 to 2004**	**Females seek and utilize health care services more**
Utilizing health care services (may include ob/gyn visits)	3.1.1.4	49	.776	8	1957 to 2004	Females probably utilize health care services more
Utilizing health care services (excluding ob/gyn visits)	3.1.1.5	46	.739	8	1967 to 2004	Females probably utilize health care services more
Hospital utilization (excluding pregnancy-related utilization)	3.1.1.8	11	.636	6	1964 to 2005	Males may utilize hospitals more
Chronic illness	3.1.1.10	14	.286	6	1964 to 2004	No established sex difference
Self-reported degree of healthiness/ill health	3.1.1.11	129	.636	24 (1+)	1957 to 2003	Males are probably healthier
Infant mortality in general	3.1.2.2	48	.667	14 (8+)	1937 to 2005	Males possibly have a greater infant mortality
Childhood mortality	3.1.2.4	24	.167	9 (2+)	17th c to 2003	No established sex difference
Life expectancy (life span, age of death) for humans	3.1.2.6a	161	.845	59 (39+)	Antiquity to 2005	Females probably live longer

13.2.3b. Sex Differences in Trauma, Cancer, and Heart Disease

According to Grand Split-Table 13.2.3b, trauma-induced injuries and fatalities appears to be universally greater for males than for females. Males also appear to universally suffer greater overall cancer rates than females despite the fact that one type of cancer is not unsurprisingly much more common in females – breast cancer. Also universal is a tendency for males who have heart attacks to experience their first episode at a younger age than females who do so.

Grand Split-Table 13.2.3b. Generalizations from tables in Chapter 3 containing ten or more studies of sex differences in humans.

Variable Name	Table Number	# Studies	Consist. Score	Diversity Score	Time Range	Generalization
Accidental injuries/fatalities in general	**3.2.1.1**	**75**	**.947**	**11 (7+)**	**1935 to 2004**	**Males have more accidental injuries**
Motor vehicle accident injury/fatality	3.2.1.2	25	.680	12	1982 to 2004	Males may have more vehicle accidents
Bone fractures/broken bones	3.2.1.5	43	.814	12	1974 to 2004	Females probably have more bone fractures
Cirrhosis of the liver	3.2.3.2	24	.250	6	1945 to 1997	No established sex difference
Cancer in general	**3.2.4.1**	**26**	**.923**	**10 (2+)**	**1942 to 2004**	**Males have a higher rate of cancer**
Breast cancer	**3.3.4.5**	**18**	**1.000**	**8**	**1943 to 2004**	**Breast cancer rates are higher in females**
Colorectal cancer	3.2.4.8	20	.400	10 (1+)	1985 to 2005	No established sex difference
Lung cancer	3.2.4.16	41	.488	12 (1+)	1974 to 2004	No established sex difference
Stomach cancer	3.2.4.24	15	.867	11 (1+)	1994 to 2004	Males have a high rate of stomach cancer
Heart disease in general (coronary heart disease)	3.2.5.1	135	.570	20 (10+)	19th c to 2004	Males possibly have a higher rate of heart disease
Hypertension	3.2.5.3	21	.143	6	1974 to 2004	No established sex difference
Angina pectoris (chest pain)	3.2.5.6	13	.692	4	1972 to 2003	Angina pectoris may be higher in females
Acute myocardial infarction (heart attack)	3.2.5.16	32	.281	9 (1+)	1974 to 2003	No established sex difference
Age of first heart attack	**3.2.5.17**	**22**	**1.000**	**4**	**1984 to 1999**	**Males have heart attacks at younger ages**
Survival after myocardial infarction	3.2.5.19	31	.742	11 (1+)	1973 to 2004	Males survive myocardial infarction more

13.2.3c. Sex Differences in Diseases Other Than Cancer and Heart Disease

Among the specific illnesses and injuries listed in Grand Split-Table 13.2.3c, four show virtually certain universal sex differences. Relative to males, females appear to suffer higher rates of lupus, multiple sclerosis, osteoporosis, and rheumatoid arthritis.

Grand Split-Table 13.2.3c. Generalizations from tables in Chapter 3 containing ten or more studies of sex differences in humans.

Variable Name	Table Number	# Studies	Consist. Score	Diversity Score	Time Range	Generalization
Abdominal pain	3.2.6.2	12	.667	6	1957 to 1994	Females possibly have more abdominal pain
Irritable bowel syndrome	3.2.6.5	21	.619	14	1966 to 2004	Females possible have IBS more
Allergies	3.2.7.7	20	.200	10	1969 to 2004	No established sex difference
Lupus	**3.2.7.15**	**14**	**1.000**	**3**	**1963 to 2004**	**Females have lupus more frequently**
Myasthenia gravis	3.2.7.16	12	.750	3	1960 to 2002	Females may have myasthenia gravis more
Alzheimer's disease	3.2.8.1	43	.721	13 (2+)	1987 to 2004	Females may have Alzheimer's disease more
Dementia	3.2.8.3	15	.800	5 (1+)	1985 to 2005	Females probably have dementia more
Epilepsy	3.2.8.6	29	.759	14	1934 to 2004	Males probably have epilepsy more
Muscular-skeletal diseases in general	3.2.9.1	19	.211	4	1966 to 1994	No established sex difference
Multiple sclerosis	**3.2.9.5**	**15**	**.933**	**11**	**1981 to 2005**	**Females have multiple sclerosis more**
Osteoarthritis	3.2.9.6	15	.800	4	1966 to 2004	Females probably have osteoarthritis more
Osteoporosis	**3.2.9.7**	**20**	**.950**	**3 (1+)**	**1966 to 2004**	**Females have osteoporosis more**
Rheumatoid arthritis	**3.2.9.9**	**16**	**.938**	**6**	**1957 to 2004**	**Females have rheumatoid arthritis more**
Asthma	3.2.11.2	36	.389	7 (7+)	1974 to 2004	No established sex difference
Pneumonia (& similar lung infections)	3.2.11.8	15	.867	2	1975 to 1999	Males have pneumonia more
Tuberculosis	3.2.11.9	34	.294	13 (2+)	1933 to 2004	No established sex difference
Diabetes mellitus	3.2.15.1	19	.421	12	1982 to 2005	No established sex difference

13.2.3d. Sex Differences in Pain and Minor Ailments

Grand Split-Table 13.2.3d shows that females universally experience headaches more often than do males. Also likely to be universal are greater tendencies for females relative to males to suffer from pain in general, from minor ailments and somatoform disorders, and from various physical disabilities and limitations.

Grand Split-Table 13.2.3d. Generalizations from tables in Chapter 3 containing ten or more studies of sex differences in humans.

Variable Name	Table Number	# Studies	Consist. Score	Diversity Score	Time Range	Generalization
Headaches in general	**3.3.1.1**	**17**	**1.000**	**7**	**1977 to 1999**	**Females have more headaches in general**
Headaches (excluding migraines and cluster headaches)	3.3.1.2	71	.831	20	1941 to 1997	Females probably have more headaches (excluding migraines and cluster headaches)
Migraine headaches	3.3.1.3	54	.833	23	1962 to 2004	Females prob. have more migraine headaches
Pain in general	**3.3.2.1**	**18**	**.944**	**5**	**1986 to 2005**	**Females experience more pain in general**
Facial and oral pain	3.3.2.4	24	.708	7	1972 to 2003	Females probably have facial & oral pain
Muscular-skeletal pain	3.3.2.6	38	.789	15	1950 to 2004	Females prob. have more muscular-skel. pain
Minor ailments in general/somatoform disorders	**3.3.4.1**	**19**	**.947**	**3**	**1980 to 1999**	**Females have more ailments in general/ somatoform disorders**
Physical disabilities/limitations	**3.3.4.9**	**20**	**.950**	**5 (1+)**	**1989 to 2004**	**Females have more physical disabilities**

13.2.4. Sex Differences in Perceptions, Motor Functioning, and Emotions (Chapter 4)

The results from tables pertaining to sex differences in perceptual acuity, motor skills, and emotionality are reviewed below in a series of three grand split-tables.

13.2.4a. Sex Differences in Perceptual Abilities and Tendencies

Grand Split-Table 13.2.4a identified one perceptual ability for which males and females are universally different. Specifically, females give higher estimates than males to threat potentials from their environmental encounters.

Grand Split-Table 13.2.4a. Generalizations from tables in Chapter 4 containing ten or more studies of sex differences in humans.

Variable Name	Table Number	# Studies	Consist. Score	Diversity Score	Time Range	Generalization
Auditory acuity	4.1.1.1	26	.615	3	1934 to 2001	Females possibly have better auditory acuity
Olfactory acuity/sensitivity	4.1.3.2	26	.846	7 (1+)	1950 to 2002	Females probably have better olfactory acuity
Odor identification	4.1.3.4	13	.692	4 (2+)	1974 to 2002	Females possibly better at odor identification
Visual acuity/sensitivity	4.1.4.1	15	.267	3	1885 to 2002	No established sex difference
Color discrimination/recognition (naming colors)/color sensitivity	4.1.4.2	27	.815	5	1903 to 2000	Females probably have better color discrimination
Perceptual speed in visual discrimination	4.1.4.4	29	.655	5	1911 to 2002	Females may be faster at visual discrimination
Estimating/perceiving environmental hazards and injury risks	**4.1.6.2**	**14**	**1.000**	**6**	**1982 to 2004**	**Females estimate/perceive greater environmental hazards and injury risks**
Right-left confusion	4.1.6.3	17	.824	4	1966 to 2002	Females may have more right-left confusion
Pain perception/detection/sensitivity in general	4.2.1.1	91	.714	10	1940 to 2003	Females appear to detect pain at lower thresholds
Perception of pain of a specific type	4.2.1.2	47	.702	3	1959 to 2005	Females probably perceive most pain more
Pain tolerance	4.2.1.3	30	.733	6	1932 to 2002	Males probably have greater pain tolerance

13.2.4b. Sex Differences in Motor Control

One sex difference in motor control that Grand Split-Table 13.2.4b suggests is universal involves fine motor skills involving the use of a widely used Pegboard Test. Nearly all studies have found females surpassing males in performing this type of task.

Grand Split-Table 13.2.4b. Generalizations from tables in Chapter 4 containing ten or more studies of sex differences in humans.

Variable Name	Table Number	# Studies	Consist. Score	Diversity Score	Time Range	Generalization
Overall motor coordination/development	4.3.2.1	22	.364	5	1912 to 2004	No established sex difference
Manual/digital dexterity/fine motor skills (except Pegboard Test)	4.3.2.9	33	.455	8	1911 to 2005	No established sex difference
Fine motor skills using the Pegboard Test	**4.3.2.10**	**16**	**.938**	**3**	**1985 to 2003**	**Females have better fine motor skills as measured by the Pegboard Test**
Finger tapping test performance	4.3.2.12	19	.789	3	1973 to 2000	Males probably better on finger tapping tests
Targeting and throwing accuracy (including ball throwing)	4.3.2.14	19	.895	4	1933 to 2000	Males have better targeting and throwing accuracy
Handedness	4.3.3.1	88	.761	21 (1+)	1934 to 2004	Males probably are more freq. right-handed
Earedness, eyedness, facedness, footedness, and mouthedness	4.3.3.2	12	0.000	5	1972 to 2005	No apparent sex difference in most aspects of sidedness (other than handedness)
Vocalizations & the beginnings of speech	4.3.4.1	32	.438	3	1925 to 1978	Females may be earlier

13.2.4c. Sex Differences in Emotions and Emotionality

According to Grand Split-Table 13.2.4c, six types of emotion-related variables appear to exhibit universal sex differences. First, females appear to be more fearful in general and their fear of crime seems to be higher than is true for males. Next, females have been repeatedly found to express greater stress and worry over tests and academic performance than do males. Frequent feelings of boredom, on the other hand, appear to be more of a male characteristic.

Emotional expressiveness appears to be more of a female than a male trait. In the case of crying, no sex difference was apparent until adulthood. At that age all of the available research concluded that females cried more than males.

Grand Split-Table 13.2.4c. Generalizations from tables in Chapter 4 containing ten or more studies of sex differences in humans.

Variable Name	Table Number	# Studies	Consist. Score	Diversity Score	Time Range	Generalization
Emotionality in general	4.4.1.1	44	.773	7	1910 to 2003	Females probably more emotional in general
Anger in general, feelings of	4.4.2.1	44	.068	8 (2+)	1927 to 2004	No established sex difference
Fearfulness in general	**4.4.3.1a**	**65**	**.969**	**11 (2+)**	**1934 to 2005**	**Females are more fearful in general**
Fear of crime victimization	**4.4.3.8**	**53**	**.962**	**11 (1+)**	**1974 to 2004**	**Females appear to be more fearful of crime victimization**
Jealousy responses to love/emotional infidelity	4.4.4.2	25	.760	6 (3+)	1987 to 2004	Females are probably more jealous in response to love/emotional infidelity
Jealousy responses to sexual infidelity	4.4.4.3	29	.241	6 (1+)	1981 to 2004	No established sex difference
Stress/distress/worry/anxiety in general	4.4.6.1a	133	.805	17	1936 to 2005	Females probably have more stress/distress/worry/anxiety in general
Stress/distress/worry/anxiety associated with providing care to others	**4.4.6.9**	**10**	**1.000**	**2**	**1985 to 2001**	**Females have more stress/worry/anxiety associated with providing care to others**
Test anxiety/anxiety involving an academic performance	4.4.6.13	35	.886	8 (3+)	1959 TO 2003	Females seem to have greater test anxiety or anxiety involving academic performance
Boredom proneness/susceptibility	**4.4.8.2**	**11**	**1.000**	**4**	**1970 to 1991**	**Males are more prone to boredom**
Guilt, embarrassment, and shame, feelings of	4.4.8.4	25	.880	7 (1+)	1963 to 2004	Females have greater feelings of guilt, embarrassment, and shame
Empathy, feelings of	4.4.9.3	42	.500	6	1936 to 2003	Females possibly have greater empathy
Emotional expressiveness in general	**4.4.10.1**	**62**	**.903**	**6 (1+)**	**1972 to 2005**	**Females are more emotionally expressive**
Crying: Pre-adults	4.4.10.4	18	.222	5	1934 to 2000	No established sex difference
Crying: Adults	**4.4.10.4**	**12**	**1.000**	**4 (1+)**	**1969 to 2004**	**Females cry more as adults**
Expressions of anger/threats	4.4.10.5	51	.176	9	1973 to 2005	No established sex difference
Expressions of happiness and laughter	4.4.10.8	15	.667	4	1973 to 2005	Females express more happiness & laughter
Facial expressions in response to emotion-provoking stimuli	4.4.10.13	18	.889	4	1943 to 2000	Females appear to be more facially expressive in response to emotion-provoking stimuli

13.2.5. Sex Differences in Intellectual, Cognitive, Self-Concept, and Mental Health/Illness Factors (Chapter 5)

Chapter 5 contained the largest number of tables with ten or more citations. The listings of these tables are presented below.

13.2.5a. Sex Differences in General Academic/Intellectual Functioning

The only sex differences in broad-ranging academic learning and learning ability that was documented as probably being universal were learning disabilities and below average intelligence. Grand Split-Table 13.2.5a shows that for both of these conditions, all or nearly all studies indicate that their prevalence among males was greater than among females.

Grand Split-Table 13.2.5a. Generalizations from tables in Chapter 5 containing ten or more studies of sex differences in humans.

Variable Name	Table Number	# Studies	Consist. Score	Diversity Score	Time Range	Generalization
Academic performance, GPA, grades in general	5.1.1.1	98	.714	15 (1+)	1910 to 2005	Females probably perform better academically
Self-rated academic ability	5.1.1.7	31	.645	2	1962 to 2002	Males possibly rate their academic ability higher
Learning disabilities/difficulties in general	**5.1.1.11**	**12**	**1.000**	**5**	**1949 to 2003**	**Males have more learning disabilities/difficulties in general**
College admission exam scores	5.1.1.13	48	.729	5	1957 to 2002	Males probably have higher college admissions exam scores
Grades in arithmetic and mathematics	5.1.2.1	24	.042	5 (1+)	1911 to 2005	No established sex difference
Grades in social sciences	5.1.2.5	17	.706	3 (1+)	1979 to 2002	Males probably have higher grades in the social sciences
Reasoning abilities in general	5.2.1.1	27	.556	13	1943 to 2002	Males possibly have better reasoning abilities in general
Intelligence/mental ability in general (full scale intelligence) for prepubertals	5.2.1.2a	86	.070	12	1891 to 2005	No established sex difference
Intelligence/mental ability in general (full scale intelligence) for adolescents and adults	5.2.1.2b	121	.479	27 (1+)	1904 to 2006	No established sex difference
Intelligence, variability in	5.2.1.5	24	.792	7	1897 to 2003	Males probably have greater variability in intelligence
Proportion above average in intelligence/genius	5.2.1.6	17	.353	3	1925 to 2002	No established sex difference
Proportion below average in intelligence/mental retardation	**5.2.1.7**	**38**	**.921**	**11**	**1897 to 1977**	**Greater proportions of males below average in intelligence**
Reaction time scores	5.2.1.12	19	.684	8	1964 to 2005	Males possibly have faster reaction times

13.2.5b. Sex Differences in Language-Based Academic/Intellectual Abilities

The only language-based academic ability that exhibited a consistency score higher than .9000 involved reading disabilities and problems learning to read. In this regard, Grand Split-Table 13.2.5b indicates that males have these problems to a greater degree than females.

Grand Split-Table 13.2.5b. Generalizations from tables in Chapter 5 containing ten or more studies of sex differences in humans.

Variable Name	Table Number	# Studies	Consist. Score	Diversity Score	Time Range	Generalization
Reading ability	5.2.2.2	79	.544	15 (1+)	1912 to 2004	Females possibly have higher reading ability
Language development	5.2.2.3	34	.765	5	1891 to 2002	Females possibly develop language earlier
Literacy	5.2.2.4	32	.125	18 (2+)	1976 to 2001	No established sex difference
Reading disabilities and reading problems	**5.2.2.8**	**22**	**.909**	**4 (1+)**	**1935 to 2002**	**Reading disabilities & reading problems probably more common in males**
Spelling	5.2.2.10	21	.667	5 (1+)	1933 to 2004	Females may be better at spelling
Verbal/language/reading comprehension	5.2.2.12	26	.385	4	1977 to 1999	No established sex difference
Verbal fluency	5.2.2.13	54	.722	6	1925 to 2005	Females probably have better verbal fluency
Verbal (linguistic) intelligence among prepubertals	5.2.2.14a	119	.185	10	1916 to 2005	No established sex difference
Verbal (linguistic) intelligence among postpubertals	5.2.2.14b	121	.248	22 (2+)	1926 t o 2005	No established sex difference
Verbal skills (verbal communication ability)	5.2.2.15	41	.829	3	1907 to 1997	Females have better verbal communication ability
Vocabulary skills (verbal, linguistic)	5.5.2.16	14	.786	2	1953 to 1990	Males probably have better vocabulary skills
Writing skills	5.2.2.18	11	.818	3	1911 to 1997	Females probably have better writing skills

13.2.5c. Sex Differences in Non-Language-Based Academic/Intellectual Abilities

Intellectual skills that rely very little on language are primarily those where one must manipulate objects or navigate within two or three dimensional space. Grand Split-Table 13.2.5c shows that most studies find males surpassing females on these skills. Nevertheless, the consistency scores were .9000 or higher for only three of these abilities. One involved a variety of mechanical problem solving tasks, another was a simple experimental task known as Piaget's water level task, and the third involved the ability to traverse two-dimensional space, such as in mazes.

Grand Split-Table 13.2.5c. Generalizations from tables in Chapter 5 containing ten or more studies of sex differences in humans.

Variable Name	Table Number	# Studies	Consist. Score	Diversity Score	Time Range	Generalization
Creativity in general	5.2.3.1	15	.133	3	1961 to 2003	No established sex difference
Spatial reasoning ability in general (prepubertal humans)	5.2.4.1a	62	.710	9 (1+)	1912 to 2005	Males probably have higher spatial reasoning ability in general prepubertally
Spatial reasoning ability in general (postpubertal humans)	5.2.4.1b	203	.823	27 (4+)	1913 to 2005	Males probably have higher spatial reasoning ability in general postpubertally
Performance IQ	5.2.4.5	53	.679	16 (3+)	1964 to 2005	Males possibly have a higher performance IQ
Block design ability	5.2.4.6	22	.500	10 (1+)	1961 to 2005	Males possibly have greater block design ability
Embedded figure test performance	5.2.4.8	52	.211	15 (2+)	1954 to 1999	No established sex difference
Field independence test performance	5.2.4.9	16	.750	2	1949 to 1993	Males probably have better field independence test performance
Maze traversing ability/maze learning/spatial navigation, humans	5.2.4.10a	47	.766	8 (2+)	1920 to 2005	Males probably have greater maze traversing ability
Mechanical problem solving/ mechanical ability	**5.2.4.11**	**29**	**.931**	**5**	**1912 to 2003**	**Males appear to be better at mechanical problem solving**
Mental rotation	5.2.4.12	88	.841	20 (2+)	1962 to 2005	Males are probably better at mental rotation
Piaget's water level test	**5.2.4.17**	**32**	**.906**	**9**	**1964 to 2003**	**Males appear to perform better on Piaget's water level test**
Rod and frame perceptual test performance (field articulation)	5.2.4.19	48	.667	11	1949 to 2004	Males possibly have better rod and frame perceptual test performance
Route-learning (map reading, direction-finding, route-finding)	5.2.4.20	33	.879	8	1941 to 2005	Males are probably better at reading maps and at learning and remembering routes
Use of landmarks to traverse geographic space	5.2.4.22	20	.850	6	1983 to 2005	Females appear to rely more on physical landmarks to traverse geographic space
Traversing 2-D space using visual cues other than landmarks	**5.2.4.24**	**22**	**.955**	**4**	**1941 to 2002**	**Males traverse 2-D space using visual cues other than landmarks more**

13.2.5d. Sex Differences in Knowledge Except Science and World Affairs

According to Grand-Split Table 13.2.5d, no sex differences in knowledge of topics outside of the field of science have been documented with consistency scores above .9000, although males come close to surpassing females at this level regarding knowledge in general and knowledge of math following puberty.

Grand Split-Table 13.2.5d. Generalizations from tables in Chapter 5 containing ten or more studies of sex differences in humans.

Variable Name	Table Number	# Studies	Consist. Score	Diversity Score	Time Range	Generalization
Knowledge in general	5.3.1.1	39	.846	10 (1+)	1891 to 2004	Males probably have more knowledge in general
AIDS knowledge	5.3.2.2	16	.063	5	1987 to 2004	No established sex difference
Mathematics knowledge/reasoning skills in general (prepubertal)	5.3.3.1a	44	.500	9 (5+)	1933 to 2001	Males possibly have more mathematics knowledge before puberty
Mathematics knowledge/reasoning skills in general (postpubertal)	5.3.3.1b	147	.810	17 (10+)	1954 to 2004	Males probably have more mathematical knowledge after puberty
Algebra and calculus knowledge/ reasoning skills	5.3.3.2	19	.316	5 (3+)	1913 to 2002	No established sex difference
Arithmetic knowledge/reasoning skills	5.3.3.3	94	.213	13 (5+)	1911 to 2004	No established sex difference
Geometry (or spatial) knowledge/reasoning skills	5.3.3.4	14	.786	6	1913 to 1999	Males probably have more geometry (or spatial) knowledge

13.2.5e. Sex Differences in Science and World Affairs Knowledge

Three sex differences in knowledge involving science appeared to be all but universal, as shown in Grand Split-Table 13.2.5e. Relative to females, males exhibit greater knowledge of computers, physical science, and geography.

Grand Split-Table 13.2.5e. Generalizations from tables in Chapter 5 containing ten or more studies of sex differences in humans.

Variable Name	Table Number	# Studies	Consist. Score	Diversity Score	Time Range	Generalization
Science knowledge in general	5.3.4.1	55	.709	16 (12+)	1928 to 2003	Males probably have more science knowledge in general
Biological science knowledge	5.3.4.2	18	.000	6	1928 to 2004	No established sex difference
Computer science knowledge/ computer literacy	**5.3.4.4**	**28**	**.929**	**9**	**1979 to 2003**	**Males seem to have more computer science knowledge/computer literacy**
Physical science knowledge	**5.3.4.5**	**26**	**.923**	**7 (2+)**	**1942 to 2004**	**Males appear to have more physical science knowledge**
Geography knowledge	**5.3.5.3**	**17**	**.941**	**4**	**1913 to 2004**	**Males appear to have more geography knowledge**
Politics/world affairs knowledge	5.3.5.6	18	.889	5	1942 to 2003	Males are likely to have more politics/world affairs knowledge

13.2.5f. Sex Differences in Memory and Recall

Studies of memory and recall differences between men and women yielded only one difference with a .9000 consistency score. As shown in Grand Split-Table 13.2.5f, females appear to surpass males in the ability to recognize and recall familiar faces.

Grand Split-Table 13.2.5f. Generalizations from tables in Chapter 5 containing ten or more studies of sex differences in humans.

Variable Name	Table Number	# Studies	Consist. Score	Diversity Score	Time Range	Generalization
Memory and memory recall in general	5.4.4.1	71	.408	7	1910 to 2004	No established sex difference
Facial recognition and recall	**5.4.4.7**	**20**	**.900**	**5**	**1970 to 2003**	**Females seem to have better facial recognition and recall**
Recalling episodes of experiences (episodic memory)	5.4.4.11	59	.678	6	1986 to 2004	Females possibly have better episodic memory
Recalling the location of objects in space (static object location memory)	5.4.4.12	32	.656	6	1969 to 2004	Females possibly have better static object location memory
Recall of visual stimuli (except faces)	5.4.4.14	11	.182	7	1974 to 2002	No established sex difference
Recalling word lists/object names/number lists	5.4.4.15	50	.380	9	1950 to 2004	No established sex difference
Stroop Color-Word Test	5.6.1.9	12	.500	2	1932 to 2000	Females possibly perform better on the Stroop Word-Color Test

13.2.5g. Sex Differences in Sleeping and Dreaming

Grand Split-Table 13.2.5g shows that two traits are virtually certain to exhibit universal sex differences, both having to do with dream content. Relative to females, males dream more about physical objects (except clothing) and about sexuality.

Grand Split-Table 13.2.5g. Generalizations from tables in Chapter 5 containing ten or more studies of sex differences in humans.

Variable Name	Table Number	# Studies	Consist. Score	Diversity Score	Time Range	Generalization
Time spent sleeping	5.5.1.1	20	.650	8	1961 to 2001	Females possibly spend more time sleeping
Dreaming, frequency of recall	5.5.2.1	25	.880	6	1907 to 2005	Females recall dreaming more
Dream content: Male "characters"	5.5.2.4	23	.609	9	1963 to 2003	Males possibly have more dreams containing other males as characters
Dream content: Physical objects and artifacts other than clothing	**5.5.2.5**	**11**	**1.000**	**5 (1+)**	**1958 to 2005**	**Males have more dreams about physical objects and artifacts with the exception of clothing**
Dream content: Sexual themes	**5.5.2.7**	**11**	**1.000**	**5 (1+)**	**1936 to 2004**	**The dreams of males contain more sexual themes**
Dream content: Social themes other than aggression	5.5.2.8	12	.500	3 (1+)	1935 to 2005	The dreams of females may contain more social themes excluding aggression
Fantasizing about sexuality	5.5.2.11	26	.769	2	1982 to 2000	Males probably have more sexual fantasies

13.2.5h. Sex Differences in Self-Reflection

Grand Split-Table 13.2.5h identifies four sex differences that surpass the .9000 threshold for being probable universal sex differences. Two indicate that males have a more positive self-image and are more self-confident. Males also appear to have greater satisfaction with their bodily appearance. Perhaps reflective of this latter point, females are more likely than males to think of themselves as being overweight.

Grand Split-Table 13.2.5h. Generalizations from tables in Chapter 5 containing ten or more studies of sex differences in humans.

Variable Name	Table Number	# Studies	Consist. Score	Diversity Score	Time Range	Generalization
Self-consciousness	5.7.1.1	13	.538	7	1957 to 2004	Females are possibly more self-conscious
Self-concept/self-image	**5.7.1.6**	**23**	**.913**	**6**	**1957 to 2002**	**Males have a more favorable self-concept/self-image**
Self-confidence/self-assuredness	**5.7.1.7**	**14**	**1.000**	**6**	**1932 to 2003**	**Males have more self-confidence/self-assuredness**
Self-esteem	5.7.1.8	153	.451	23 (2+)	1973 to 2004	No established sex difference
Self-assessed athletic ability/coordination	5.7.2.1	31	.677	7	1981 to 2002	Males possibly have a better self-assessed athletic ability/coordination
Body satisfaction	**5.7.2.4**	**32**	**.938**	**10**	**1966 to 2005**	**Males have more body satisfaction**
Self-assessed being overweight (wanting to lose weight)	**5.7.2.6**	**39**	**1.000**	**7**	**1965 to 2004**	**Females are more inclined to consider themselves overweight**
Self-assessed academic/intellectual ability/competence in general	5.7.3.1	82	.439	8	1980 to 2005	No established sex difference
Self-assessed intelligence/IQ in particular	5.7.3.2	38	.763	14 (6+)	1978 to 2005	Males probably have a higher self-assessed intelligence
Self-assessed reading skill/ability	5.7.3.5	15	.467	2	1979 to 2002	No established sex difference
Self-assessed math/spatial/science reasoning skill/ability	5.7.3.6	84	.798	10 (6+)	1979 to 2005	Males probably have a higher self-assessed math/spatial/science reasoning skill/ability

13.2.5i. Sex Differences in Confidence and Happiness

Two universal sex differences are likely to exist in how people explain their successes and failures in life (Grand Split-Table 13.2.5i). Nearly all studies have found that relative to males, females are more likely to attribute failure to internal (self-related) factors. When asked to explain their failure at various physical or cognitive skilled tasks, females are more likely than men to blame themselves rather than forces outside themselves.

Grand Split-Table 13.2.5i. Generalizations from tables in Chapter 5 containing ten or more studies of sex differences in humans.

Variable Name	Table Number	# Studies	Consist. Score	Diversity Score	Time Range	Generalization
Confidence in one's abilities in general	5.7.5.1	11	.818	1	1972 to 1997	Males probably have more confidence in their abilities in general
Confidence in one's academic ability	5.7.5.2	11	.818	3	1982 to 2001	Males probably have more confidence in their academic ability
Confidence in one's ability to perform various experimental tasks	5.7.5.4	22	.318	2	1971 to 1998	No established sex difference
Confidence in one's ability to perform tasks after experimentally induced failure	5.7.5.5	12	.167	1	1975 to 2004	No established sex difference
Confidence in one' s ability to socially interact with others	5.7.5.6	15	.000	3	1981 to 1991	No established sex difference
Diminished performance (or performance expectations) following past failure	5.7.5.10	16	.313	2	1973 to 1992	No established sex difference
Internal (vs. external) locus of control in general	5.7.6.1	15	.933	3 (2+)	1973 to 1998	Males have higher internal locus of control
Attribute success to effort, ability, and other internal forces	5.7.6.2	51	.176	5	1969 to 1991	No established sex difference
Attribute personal success to luck or other external forces	**5.7.6.3**	**22**	**.909**	**2**	**1963 to 1988**	**Females seem to attribute more of their successes to luck or other external forces**
Attribute failure to internal forces ("self")	**5.7.6.4**	**10**	**1.000**	**2**	**1973 to 1982**	**Females more frequently attribute failure to internal forces**
Emotional well-being	5.7.7.1	11	.727	5	1923 to 2003	Males probably have higher emotional well-being
Personal happiness (life satisfaction)	5.7.7.2	89	.011	11	1949 to 2001	No established sex difference
Marital happiness/satisfaction with one's spouse	5.7.7.3	21	.000	2	1961 to 2002	No established sex difference
Satisfaction with one's job in general/job satisfaction	5.7.7.5	66	.242	9 (3+)	1940 to 2004	No established sex difference

13.2.5j. Sex Differences in General Forms of Mental Illness

One sex differences in mental health/illness is likely to be universal. With respect to having behavioral disturbances in general, Grand Split-Tables 13.2.5j suggests that males are more afflicted than females.

Grand Split-Table 13.2.5j. Generalizations from tables in Chapter 5 containing ten or more studies of sex differences in humans.

Variable Name	Table Number	# Studies	Consist. Score	Diversity Score	Time Range	Generalization
Mental illness in general	5.8.1.1	71	.775	13	1957 to 2002	Females probably have a higher rate of mental illness in general
Seeking/obtaining medical/ psychological/emotional help for drug dependency	5.8.1.4	13	.077	4	1986 to 2004	No established sex difference
Behavioral disturbances	**5.8.1.5**	**63**	**.984**	**8**	**1941 to 1996**	**Males have more behavioral disturbances**
Psychoneurosis/psychotic/ psychosomatic disorders	5.8.1.6	18	.500	6	1925 to 1996	Females possibly have more psycho-neurotic/psychotic/psychosomatic disorders
Externalizing behavior	5.8.1.9	23	.870	5 (2+)	1960 to 2001	Males display more externalizing behavior

13.2.5k. Sex Differences in Depressive Forms of Mental Illness

According to Grand Split-Tables 13.2.5k, females are more likely than males to repeatedly ponder negative emotional experiences, a phenomenon clinically known as ruminating. However, it is surprisingly noteworthy that the widely recognized tendency for females to experience depression more than males did not reach the .9000 consistency score criterion, even for postpubertal samples.

Grand Split-Table 13.2.5k. Generalizations from tables in Chapter 5 containing ten or more studies of sex differences in humans.

Variable Name	Table Number	# Studies	Consist. Score	Diversity Score	Time Range	Generalization
General depression (affective disorders), self-diagnosed (prepubertal)	5.8.2.1a	75	.027	10	1982 to 2004	No established sex difference
General depression (affective disorders), self-diagnosed (postpubertal)	5.8.2.1b	209	.761	31 (4+)	1953 to 2004	General depression (affective disorders), self-diagnosed (postpubertal) probably more common in females
Depression/unipolar depression, clinically diagnosed (prepubertal) (except bipolar)	5.8.2.2a	24	.250	6	1978 to 2004	No established sex difference
Depression/unipolar depression, clinically diagnosed (postpubertal) (other than bipolar)	5.8.2.2b	281	.875	50 (7+)	1942 to 2005	Following puberty, females appear to have more depression/unipolar depression, clinically diagnosed (postpubertal)
Age of onset of depression	5.8.2.4	19	.474	5	1952 to 2000	No established sex difference
Bipolar (manic) depression	5.8.2.12	48	.229	16	1961 to 2000	No established sex difference
Ruminating over negative emotional experiences	**5.8.2.16**	**21**	**1.000**	**5 (1+)**	**1982 to 2002**	**Females ruminate more over negative emotional experiences**

13.2.5l. Sex Differences in Mental Illness, Continued

In the Grand Split-Table 13.2.5l, an additional apparently universal sex difference in mental illness is revealed. It suggests that females are more likely than males to have general psychological distress.

Grand Split-Table 13.2.5l. Generalizations from tables in Chapter 5 containing ten or more studies of sex differences in humans.

Variable Name	Table Number	# Studies	Consist. Score	Diversity Score	Time Range	Generalization
Schizophrenia in general	5.8.3.1	61	.803	18 (3+)	1951 to 2004	Males probably have more schizophrenia
Age of onset of schizophrenia (diagnosis)	5.8.3.3	61	.738	20 (4+)	1911 to 2004	Males probably have an earlier onset of schizophrenia
Schizophrenia-atypical symptom expression (high affect, schizoaffective)	5.8.3.5	19	.158	2	1951 to 1995	No established sex difference
Suicide ideation	5.8.4.1	46	.652	17 (1+)	1971 to 2003	Females possibly have more suicide ideation
Attempted suicide	5.8.4.2	78	.603	23 (4+)	1952 to 2004	Females possibly attempt suicide more
Completed suicide	5.8.4.3	198	.813	34 (29+)	1881 to 2003	Males probably complete suicide more
Attempted/completed suicide among manic depressives	5.8.4.4	17	.529	6	1921 to 1988	Females possibly attempt/compete suicide when manic depressive
Psychological distress/mental problems in general	**5.9.1.1**	**14**	**1.000**	**4**	**1979 to 2004**	**Females experience more psychological distress/mental problems in general**
Neuroticism	5.9.1.3	27	.741	7 (1+)	1950 to 2004	Females probably have higher neuroticism

13.2.5m. Sex Differences in Mental Illness, Continued

According to Grand Split-Table 13.2.5m, relative to females, males exhibit higher rates of alcohol dependency and alcoholism, childhood conduct disorders, adolescent and adult antisocial personality disorder, attention deficit hyperactivity disorder, psychoticism, and autism/Asperger syndrome. Females, on the other hand, are more likely than males to suffer from all types of eating disorders, particularly anorexia and bulimia. Phobias and panic attack disorders are also more common in females than in males.

Grand Split-Table 13.2.5m. Generalizations from tables in Chapter 5 containing ten or more studies of sex differences in humans.

Variable Name	Table Number	# Studies	Consist. Score	Diversity Score	Time Range	Generalization
Drug addiction/substance abuse disorders	5.9.3.2	19	.053	5 (1+)	1950 to 2004	No established sex difference
Problem drinking or alcohol dependency	**5.9.3.4**	**14**	**1.000**	**3**	**1953 to 2002**	**Males have a higher rate of problem drinking/alcohol dependency**
Alcoholism	**5.9.3.5**	**70**	**.986**	**10 (1+)**	**1933 to 2002**	**Males have a higher rate of alcoholism**
Conduct disorders	**5.9.4.1**	**79**	**.937**	**12**	**1957 to 2002**	**Males have a higher rate of conduct disorders**
Antisocial/behavior personality disorder	**5.9.4.2**	**37**	**.973**	**10**	**1973 to 2001**	**Males have a higher rate of antisocial/behavior personality disorder**
Obsessive compulsive disorder in general	5.9.5.1	29	.069	9	1978 to 2004	No established sex difference
Age of onset for obsessive compulsive disorder	5.9.5.2	20	.650	7	1988 to 2004	Males possibly have an earlier age of onset for compulsive obsessive disorder
Pathological/compulsive gambling	5.9.5.4	38	.842	10	1986 to 2005	Males probably have a higher rate of pathological/compulsive gambling
Eating disorders in general	**5.9.6.1**	**12**	**1.000**	**3**	**1991 to 2002**	**Eating disorders are more common in females**
Anorexia nervosa	**5.9.6.2**	**25**	**1.000**	**8**	**1976 to 2004**	**Anorexia nervosa is more common in females**
Bulimia	**5.9.6.3**	**30**	**1.000**	**9**	**1983 to 2003**	**Females have a higher rate of bulimia**
Post traumatic stress disorder	5.9.8.1	49	.592	5	1987 to 2003	Females possibly have a higher rate of post traumatic stress disorder
Stress and anxiety disorder in general	5.9.8.2	23	.739	8 (2+)	1977 to 2002	Females probably have a higher rate of stress and anxiety disorder in general
Panic disorder	**5.9.8.3**	**29**	**1.000**	**5**	**1984 to 2002**	**Panic disorders more common in females**
Phobias in general	**5.9.8.4**	**22**	**.955**	**2**	**1966 to 1996**	**Females have more phobias in general**
Behavioral problems/disorders in general	**5.9.9.1**	**16**	**.938**	**3**	**1923 to 2002**	**Males have more behavioral problems/ disorders in general**
Attention deficit hyperactivity disorder/hyperactivity	**5.9.9.2**	**51**	**1.000**	**8**	**1963 to 2004**	**Attention deficit hyperactivity disorder/ hyperactivity are more common in males**
Autism and Asperger syndrome	**5.9.9.4**	**28**	**1.000**	**8**	**1960 to 2004**	**Males have higher rates of autism and Asperger syndrome**
Psychoticism	**5.9.9.9**	**12**	**1.000**	**7 (1+)**	**1971 to 1997**	**Males have higher psychoticism**

13.2.6. Sex Differences in Preferences, Interests, Attitudes, Beliefs, and Intentions (Chapter 6)

Many studies have documented sex differences in preferences, interests, attitudes, beliefs, and intentions. The series of split-tables below summarize the findings from tables found in Chapter 6 that are based on the findings from ten or more studies.

13.2.6a. Sex Differences in Preferences and Interests

As shown in Grand Split-Table 13.2.6a, females have consistently been shown to like school more than males do. Nevertheless, males express a greater interest in the physical sciences and technology as academic subjects than is true for females. Studies have also consistently found that, relative to females, males express greater approval for the use of aggression to settle disputes. Other preferences in which males seem to universally exceed females involve both observing and engaging in sporting events.

Grand Split-Table 13.2.6a. Generalizations from tables in Chapter 6 containing ten or more studies of sex differences in humans.

Variable Name	Table Number	# Studies	Consist. Score	Diversity Score	Time Range	Generalization
Preference for sweet tastes or saccharin flavor	6.1.1.1	10	.600	1	1958 to 1991	Males possibly prefer sweet tastes more
Preference for blue	6.1.2.4	12	.833	6	1927 to 2001	Males probably prefer blue more
Liking school in general	**6.2.2.1**	**21**	**1.000**	**8**	**1944 to 2005**	**Females like school more**
Interest in/preference for mathematics	6.2.2.4	27	.852	8 (1+)	1930 to 2005	Males have more interest in mathematics
Interest in physical science and technology	**6.2.2.6**	**16**	**1.000**	**4**	**1931 to 1998**	**Males have more interest in the physical sciences and technology**
Preferring to socialize with one's own (rather than the opposite) sex	6.2.3.7	11	.636	1	1978 to 1994	Females possibly prefer to socialize with other females
Preference for/acceptance of aggressive responses to problems	**6.2.3.11**	**23**	**1.000**	**3**	**1983 to 2002**	**Males prefer/accept aggressive responses to problems more**
Interest in competing/preference for competitive social activities	6.2.3.13	19	.895	3	1971 to 1997	Males appear to have more interest in competitive social activities
Interest in (preference for inter-actions with) infants & young children	**6.2.3.14**	**44**	**.909**	**4**	**1957 to 2002**	**Females probably have more interest in interacting with infants & young children**
Interest in protecting (providing care to) others (except to infants and young children)	6.2.3.17	15	.600	1 (1+)	1967 to 1993	Females possibly have more interest in protecting and providing care to others (except to infants and young children)
Preference for intimate (non-sexual) same-sex relationships	6.2.3.18	14	.857	1	1971 to 1997	Females seem to prefer intimate (non-sexual) same-sex relationships more
Interest in politics	6.2.3.33	27	.593	6 (2+)	1944 to 2005	Males perhaps have more interest in politics
Interest in observing sports/sporting activities (spectator sports interest)	**6.2.4.2**	**15**	**1.000**	**6**	**1970 to 2002**	**Males have more interest in observing sports**
Interest in participating in sporting activities	**6.2.4.3**	**18**	**1.000**	**6**	**1930 to 2003**	**Males have more interest in participating in sporting activities**
Interest in athletic activities in general	**6.2.4.6**	**11**	**1.000**	**4**	**1933 to 2005**	**Males have more interest in athletic activities in general**

13.2.6b. Sex Differences in Preferences Pertaining to Sexuality

Apparent universal sex differences have been identified that involve preferences related to sexual behavior and sexual interactions. Males have been repeatedly found to have more of a desire for sex and with greater numbers of sex partners than do females.

Grand Split-Table 13.2.6b. Generalizations from tables in Chapter 6 containing ten or more studies of sex differences in humans.

Variable Name	Table Number	# Studies	Consist. Score	Diversity Score	Time Range	Generalization
Speed of falling in love	6.2.5.9	12	.667	3	1930 to 2005	Males possibly fall in love faster
Desire for promiscuous sexual relationships/numerous sex partners	**6.2.5.11**	**15**	**1.000**	**4 (1+)**	**1973 to 2003**	**Males desire promiscuous sexual relationships/numerous sex partners more**
Interest in sex (strength of sex drive)	**6.2.5.14**	**30**	**1.000**	**7**	**1971 to 2005**	**Males have more interest in sex and a stronger sex drive**
Sexual arousal in general	6.2.5.18	21	.476	3	1966 to 1991	No established sex difference
Preference for sexually-oriented erotica	6.2.5.24	24	.458	5	1973 to 2003	No established sex difference
Interest in (arousal by) visual aspects of sexuality	6.2.5.28	18	.722	3	1967 to 2005	Males probably have more interest in and are aroused by the visual aspects of sexuality

13.2.6c. Sex Differences in Preferences Pertaining to Sexuality, Continued

Regarding what they are looking for in mates, males have been found to rate physical attractiveness as more important than do females. Females, on the other hand, prefer mates who are taller relative to themselves to a greater degree than males, and they are more likely to consider the possession of resources and status as more important than do males. When it comes to age, in every pertinent study that was located, males prefer mates who are younger than themselves, and females prefer mates who are older than themselves.

Grand Split-Table 13.2.6c. Generalizations from tables in Chapter 6 containing ten or more studies of sex differences in humans.

Variable Name	Table Number	# Studies	Consist. Score	Diversity Score	Time Range	Generalization
Preference for mates who are physically attractive	**6.2.6.1**	**81**	**.975**	**24 (2+)**	**1945 to 2004**	**Males prefer mates who are physically attractive more**
Preference for mates who are taller (relative to oneself)	**6.2.6.2**	**11**	**1.000**	**2 (1+)**	**1977 to 2002**	**Females prefer mates who are taller than themselves more**
Preference for mates with access to resources (wealth)	**6.2.6.3**	**37**	**.973**	**15 (2+)**	**1976 to 2004**	**Females prefer mates with access to resources (wealth, big income) more**
Preference for mates with high social status	**6.2.6.4**	**20**	**1.000**	**5 (3+)**	**1966 to 2002**	**Females prefer mates with high social status more**
Preference for mates who are younger (relative to oneself)	**6.2.6.11**	**38**	**1.000**	**15 (1+)**	**1976 to 2002**	**Males prefer mates who are younger than themselves more**
Preference for mates who are older (relative to oneself)	**6.2.6.12**	**11**	**1.000**	**8 (3+)**	**1989 to 2002**	**Females prefer mates who are older than themselves more**

13.2.6d. Sex Differences in Preferences for Technology and Toys

The only technology or toy preference for which a sex difference surpassing the .9000 consistency score was found involved masculine play and/or playing with masculine toys (Grand Split-Table 13.2.6d). Not surprisingly, males expressed stronger preferences for such activities than did females. Nonetheless, it may be worth noting that there were a few studies that failed to identify a significant sex difference in this regard.

Grand Split-Table 13.2.6d. Generalizations from tables in Chapter 6 containing ten or more studies of sex differences in humans.

Variable Name	Table Number	# Studies	Consist. Score	Diversity Score	Time Range	Generalization
Positive attitude toward computers and the internet	6.2.8.12	64	.766	8	1983 to 2003	Males probably have more positive attitudes toward computers and the internet
Masculine play/toy preferences in general	**6.2.9.1**	**35**	**.943**	**35**	**1963 to 2005**	**Males prefer masculine play and toys in general more**
Feminine play/toy preferences in general	6.2.9.2	27	.852	27	1913 to 2005	Females prefer feminine play and toys in general more

13.2.7. Sex Differences in Drug, Therapeutic, and Stress-Related Responses (Chapter 7)

Chapter 7 was the only chapter containing more citations to studies of non-humans than humans. The reason for this is that most of the detailed research on the effects of drugs and stress comes from experiments that are often beyond what is permissible with human subjects. Predictably, therefore, only a relatively few tables in Chapter 7 contained ten or more studies of human subjects. As shown in Grand Table 13.2.7, only two findings of sex differences reached or surpassed a consistency score of .9000. One indicated that females are more likely to die from coronary artery bypass surgery than is true for males receiving such surgery, while the other suggested that males exhibit a more pronounced elevation of adrenaline when they are subjected to stress than is true for females.

Grand Table 13.2.7. Generalizations from tables in Chapter 7 containing ten or more studies of sex differences in humans.

Variable Name	Table Number	# Studies	Consist. Score	Diversity Score	Time Range	Generalization
Alcohol exposure, effects on metabolism	7.4.5.7	22	.136	3	1971 to 2002	No established sex difference
Coronary artery bypass surgery, death following	**7.14.2.2**	**12**	**.917**	**4**	**1990 to 2005**	**Females appear to have greater mortality from coronary artery bypass surgery**
Favorably responding to treatment for drug abuse/addiction	7.17.1.3	25	.400	4	1980 to 2004	No established sex difference
Stress exposure, effects on adrenaline (epinephrine)	**7.19.1.2**	**11**	**.909**	**5**	**1972 to 1998**	**Males seem to exhibit a greater adrenaline response to stress**
Stress exposure, effects on cortisol levels	7.19.2.8	11	.364	2	1978 to 2000	No established sex difference
Stress exposure, effects on blood pressure	7.19.4.2	16	.875	1	1976 to 1999	Males probably have a greater elevated blood pressure response to stress
Stress exposure, effects on heart rate	7.19.4.6	23	.391	5	1966 to 2002	No established sex difference

13.2.8. Sex Differences in Personality and General Behavior (Chapter 8)

Personality and general behavior patterns have been studied extensively with respect to possible sex differences. As shown in the following two split-tables, these studies have uncovered several apparent universal sex differences.

13.2.8a. Sex Differences in Personality Traits

As shown in Grand Split-Table 13.2.8a, various forms of exploratory behavior have been shown to be more common among males than among females.

Grand Split-Table 13.2.8a. Generalizations from tables in Chapter 8 containing ten or more studies of sex differences in humans.

Variable Name	Table Number	# Studies	Consist. Score	Diversity Score	Time Range	Generalization
Achievement orientation/intrinsic motivation/ambitiousness	8.1.1.1	24	.417	7 (2+)	1951 to 2003	No established sex difference
Assertiveness	8.1.1.3	24	.875	8	1930 to 2003	Males are more assertive
Boredom proneness	8.1.1.5	13	.769	2 (1+)	1979 to 2002	Males probably are more prone to boredom
Dogmatism	8.1.1.8	13	.231	3	1963 to 1997	No established sex difference
Extroversion	8.1.1.9	17	.412	6 (1+)	1927 to 1997	No established sex difference
Impulsivity/disinhibition (acting on the spur of the moment)	8.1.1.11	26	.077	10	1973 to 2004	No established sex difference
Activity level/locomotor activity (prepubertal humans)	8.1.2.3a	56	.643	6	1930 to 2002	Prepubertal males are possibly more active
Activity level/locomotor activity (postpubertal humans)	8.1.2.3b	43	.814	10	1943 to 2005	Postpubertal males are probably more active
Exploratory behavior (in general)	**8.1.2.9a**	**24**	**1.000**	**8 (1+)**	**Prehistoric times to 1996**	**Males engage in more exploratory behavior**
Resisting temptation (inhibiting impulses)	8.1.2.16	15	.333	1	1963 to 1997	No established sex difference
Self-sufficiency/resourcefulness/ independence	8.1.2.18	10	.700	4	1953 to 2002	Males are probably more self-sufficient

13.2.8b. Sex Differences in Personality Traits, Continued

Grand Split-Table 13.2.8b reveals that females have repeatedly been found to be friendlier, while males are more hostile and conflict oriented. Regarding religiosity, females seem to surpass males according to nearly all studies throughout the world. Predictably, females have been found to be more feminine than males. Gravitation toward risk-oriented careers and business decision making is more of a male than a female characteristic, as is overall competitiveness.

Grand Split-Table 13.2.8b. Generalizations from tables in Chapter 8 containing ten or more studies of sex differences in humans.

Variable Name	Table Number	# Studies	Consist. Score	Diversity Score	Time Range	Generalization
Cooperative behavior	8.2.1.3	31	.516	3	1929 to 2000	Females possibly engage in more cooperative behavior
Defiance/rebellious/disobedient toward authority	8.2.1.5	17	.824	1	1928 to 1987	Males are probably more defiant
Friendliness	**8.2.1.6**	**11**	**1.000**	**4**	**1957 to 2001**	**Females are friendlier**
Hostile/conflict behavior	**8.2.1.7**	**14**	**1.000**	**2**	**1931 to 2003**	**Males are more hostile**
Morningness (vs. eveningness)	8.2.1.10	14	.429	8	1981 to 2002	No established sex difference
Selfishness	8.2.1.13	12	.167	1	1965 to 1998	No established sex difference
Involvement in religious activities in general	**8.2.2.1**	**22**	**.909**	**5**	**19th c to 2002**	**Females appear to be more involved in religious activity**
Church/mosque/synagogue attendance	**8.2.2.4**	**52**	**.962**	**9 (1+)**	**1949 to 2002**	**Females seem to attend church/mosque/synagogue more**
Risk-taking/recklessness in general	8.2.4.1	91	.824	11	1927 to 2002	Males probably take more risks
Gambling	8.2.4.5	58	.621	10	1964 to 2005	Males possibly gamble more
Taking health and safety risks	8.2.4.8	21	.429	6	1973 to 2004	No established sex difference
Risk-taking in career and business decisions	**8.2.4.9**	**17**	**1.000**	**3**	**1978 to 2002**	**Males take more career and business decision risks**
Sensation seeking (general)	8.2.5.1	29	.828	12 (1+)	1971 to 2002	Males probably seek more sensation
Femininity	**8.2.6.3**	**30**	**1.000**	**9 (1+)**	**1949 to 2004**	**Females are more feminine**
Masculinity	8.2.6.4	52	.827	11 (1+)	1949 to 2004	Males are probably more masculine
Persistence at self-selected tasks	8.2.7.2	22	.773	2	1951 to 2000	Males are probably more persistent at self-selected tasks
Competitiveness	**8.2.7.4**	**32**	**.938**	**7 (1+)**	**1976 to 1993**	**Males appear to be more competitive**

13.2.8c. Sex Differences in Specific Behavior Patterns

Several apparent universal sex differences were revealed in fairly specific behavioral patterns, as shown in Grand Split-Table 13.2.8c. One involved the use of a "cradling" style of carrying books, which was more common for females than for males. Males, on the other hand, have been found to masturbate more than do females. Accuracy in assessing the emotional expressions of others has been shown to be greater for females than for males.

Concerning health-related behavior, females are more likely to take preventive health precautions, to eat healthier diets, and to diet more than males. The only health-related behavior for which males have been shown to surpass females is that of physically exercising more.

Grand Split-Table 13.2.8c. Generalizations from tables in Chapter 8 containing ten or more studies of sex differences in humans.

Variable Name	Table Number	# Studies	Consist. Score	Diversity Score	Time Range	Generalization
Use the cradling book carrying style	**8.2.8.2**	**11**	**1.000**	**1**	**1976 to 1993**	**Females are more likely to use a cradling books carrying style**
Masturbation	**8.2.8.10**	**40**	**.975**	**9 (1+)**	**1953 to 2005**	**Males appear to masturbate more**
Accuracy in assessing the emotional expressions of others	**8.2.9.1**	**38**	**.947**	**9**	**1932 to 2004**	**Females appear to be more accurate in assessing the emotional expressions of others**
Taking preventive health precautions/ health maintenance in general	**8.3.1.1**	**24**	**.917**	**5**	**1974 to 2004**	**Females take more preventive health precautions**
Physical activity and exercise	**8.3.1.2**	**85**	**.929**	**15 (4+)**	**1934 to 2004**	**Males engage in more physical activity and exercise**
Eating healthy foods	**8.3.2.1**	**14**	**.929**	**3**	**1985 to 2003**	**Females eat healthier foods**
Dieting (making an effort to lose/not gain weight)	**8.3.2.2**	**40**	**1.000**	**9 (1+)**	**1950 to 2004**	**Females diet and/or attempt to lose weight more**

13.2.9. Sex Differences in Social Behavior (Chapter 9)

Tables contained in Chapter 9 on sex differences in social behavior containing citations to at least ten findings with regard to human subjects are reviewed in the following seven grand split-tables.

13.2.9a. Sex Differences in Various Social Activities

As shown in Grand Split-Table 13.2.9a, females have been shown to establish and maintain eye contact with others to a greater extent than is true for males.

Grand Split-Table 13.2.9a. Generalizations from tables in Chapter 9 containing ten or more studies of sex differences in humans.

Variable Name	Table Number	# Studies	Consist. Score	Diversity Score	Time Range	Generalization
Time spent in the company of others (social orientation in general)	9.1.1.2	11	.818	1	1942 to 1999	Females probably spend more time with others
Number of friends in general	9.1.1.3	14	.286	5	1926 to 2005	No established sex difference
Conformity in general	9.1.2.1	16	.500	3	1955 to 2002	Females possibly conform more
Conformity to empirical judgments in the presence of others	9.1.2.2	73	.329	7	1955 to 1977	No established sex difference
Conformity to empirical judgments in the absence of others	9.1.2.3	24	.042	2	1959 to 1975	No established sex difference
Using competitive strategies when mediating conflict	9.1.2.6	13	.615	1	1977 to 1991	Males are possibly more likely to use competitive strategies when mediating conflict
Establishing/maintaining eye contact in social interactions in general	**9.1.3.4**	**10**	**1.000**	**2**	**1963 to 2002**	**Females establish and maintain eye contact in social interactions more**

13.2.9b. Sex Differences in Various Social Activities, Continued

According to Grand Split-Table 13.2.9b, caring for one's own offspring is always more common for females than for males according to all available studies, a sex difference also documented in other mammalian species. Females also may be universally more involved in caring for others in general. Perhaps related to the above two gender differences is the finding that among divorced couples, mothers are more likely than fathers to be granted primary custody of the children.

Additionally, numerous studies have found widespread tendencies for females to socially interact in small groups to a greater degree than males. Similarly, females appear to have more intimate social friendship interactions than is true for males.

Grand Split-Table 13.2.9b. Generalizations from tables in Chapter 9 containing ten or more studies of sex differences in humans.

Variable Name	Table Number	# Studies	Consist. Score	Diversity Score	Time Range	Generalization
Providing nurturing behavior toward infants in general	9.1.4.8	78	.718	7	1953 to 1998	Females probably provide more nurturing behavior toward infants
Caring for one's own offspring/parenting activities	**9.1.4.10**	**38**	**1.000**	**9 (6+)**	**1967 to 2000**	**Females provide more care to their offspring**
Providing care/nurturance for others in general (excluding one's offspring)	**9.1.4.11**	**12**	**.917**	**4 (1+)**	**1953 to 2005**	**Females provide more care to others in general**
Receiving primary custody of children after divorce (or being a single-parent)	**9.1.4.13**	**14**	**1.000**	**4**	**1975 to 2001**	**Females have primary custody of their children following divorce more**
Time spent socially interacting outside the family or in general	9.1.5.1	18	.778	5	1949 to 2003	Females probably devote more time to social interactions
Social interaction in small groups	**9.1.5.4**	**23**	**1.000**	**6**	**1902 to 2004**	**Females are more likely to interact socially in small groups**
Having intimate friendships/social relationships	**9.1.7.2**	**35**	**1.000**	**5 (1+)**	**1963 to 2005**	**Females are more likely to have intimate friendships**

13.2.9c. Sex Differences in Providing Help and Friendship

Grand Split-Table 13.2.9c shows that there were no sex differences in providing help to others (or in receiving help from others) or in the tendency to smile in the presence of other that attained at least a .9000 consistency score.

Grand Split-Table 13.2.9c. Generalizations from tables in Chapter 9 containing ten or more studies of sex differences in humans.

Variable Name	Table Number	# Studies	Consist. Score	Diversity Score	Time Range	Generalization
Behaving altruistically/pro-socially in general	9.2.1.1	22	.682	7	1970 to 2005	Females possibly behave more altruistically
Helping behavior	9.2.1.3	115	.104	7	1943 to 2002	No established sex difference
Seeking/receiving support from others in general	9.2.2.1	34	.441	8	1974 to 2003	No established sex difference
Correctly interpreting nonlinguistic communication in general	9.3.1.1	28	.571	2	1939 to 1999	Females are possibly more likely to correctly interpret nonlinguistic communication
Smiling behavior (prepubertal)	9.3.1.6a	23	.609	4 (1+)	1932 to 2001	Prepubertal females possibly smile more frequently
Smiling behavior (postpubertal)	9.3.1.6b	84	.857	8 (2+)	1966 to 2002	Postpubertal females smile more frequently

13.2.9d. Sex Differences in Communication Behavior

According to Grand Split-Table 13.2.9d, several sex differences appear to be universal, or nearly so, regarding how people communicate. Females appear to universally use more tentative language when they communicate. In other words, whereas males would be more likely to make emphatic statements, females would be more inclined to use terms such as "seem" and "possibly" when making the same assertions. Also, females are more inclined to confide or share intimate secrets with close friends than are males.

Nearly all studies indicate that males dominate in inter-sex verbal communication and that they are more quarrelsome in their communication than females. Males also appear to be universally more likely to interrupt others when others are speaking and they devote more of their conversations to leisure and work than do females.

Grand Split-Table 13.2.9d. Generalizations from tables in Chapter 9 containing ten or more studies of sex differences in humans.

Variable Name	Table Number	# Studies	Consist. Score	Diversity Score	Time Range	Generalization
Cheating	9.3.2.5	30	.433	2	1928 to 1996	No established sex difference
Vocabulary, extensiveness and accuracy	9.4.1.3	31	.194	5	1891 to 1997	No established sex difference
Swearing and cursing	9.4.1.4	41	.805	6	1935 to 2003	Males probably swear and curse more
Using tentative language (qualifiers and hedging words)	**9.4.1.13**	**17**	**.941**	**2**	**1973 to 2003**	**Females use more tentative language**
Linguistic communication in general, extensiveness of	9.4.2.2	92	.457	7	1964 to 2004	No established sex difference
Affiliative speech	9.4.2.3	26	.423	4	1971 to 2000	No established sex difference
Issuing commands/instructions or using assertive speech	9.4.2.7	30	.300	4	1979 to 2004	No established sex difference
Asking questions	9.4.2.10	14	.714	2	1975 to 1999	Females probably ask more questions
Mixed-sex verbal/linguistic communication (time spent conversing)	**9.4.2.12**	**24**	**.958**	**5**	**1951 to 2002**	**Males dominate inter-sex verbal communication**
Arguing and quarreling/being quarrelsome	**9.4.2.13**	**11**	**.909**	**1**	**1933 to 1999**	**Males are more likely to argue and quarrel**
Confiding/sharing secrets with close friends	**9.4.2.14**	**31**	**1.000**	**6**	**1958 to 2005**	**Females are more likely to confide with friends**
Insulting/negative communication	9.4.2.17	10	.800	3	1972 to 2003	Males probably use more insulting and negative communication
Interrupting others as they speak (conversational dominance)	**9.4.2.19**	**14**	**.929**	**3**	**1955 to 2004**	**Males more frequently interrupt others as they speak**
Interrupting a member of the opposite sex when they are speaking	**9.4.2.20**	**21**	**.905**	**2**	**1968 to 1998**	**Males more frequently interrupt females when they are speaking**
Conversations focused on emotions and feelings	9.4.4.4	42	.881	2	1932 to 1998	Females are more likely to engage in conver-sations focused on emotions & feelings
Conversations focused on leisure or work	**9.4.4.8**	**14**	**1.000**	**2**	**1922 to 1993**	**Males are more likely to engage in conversations focused on leisure or work**

13.2.9e. Sex Differences in Play and Leisure Activities

Regarding play, several distinct sex differences are apparent in Grand Split-Table 13.2.9e. To be expected, males were found to play more with masculine toys and females more with feminine toys. Dolls and stuffed animal toys were more popular among females, while mechanical and construction type toys were more popular among males. In the case of social play and sports, males were all but universally more likely than females to gravitate toward competitive activities as well as toward rough-and-tumble play.

Grand Split-Table 13.2.9e. Generalizations from tables in Chapter 9 containing ten or more studies of sex differences in humans.

Variable Name	Table Number	# Studies	Consist. Score	Diversity Score	Time Range	Generalization
Playing with masculine (rather than feminine) toys	**9.5.1.2**	**13**	**1.000**	**2**	**1961 to 1997**	**Males are more likely to play with masculine (rather than feminine) toys**
Play involving dolls and stuffed animals	**9.5.1.10**	**16**	**1.000**	**3**	**1910 to 1994**	**Females are more likely to play with dolls and stuffed animals**
Playing house/pretend parenting	**9.5.1.11**	**12**	**1.000**	**3**	**1910 to 2002**	**Females are more likely to play house**
Play with mechanical/construction/ building objects	**9.5.1.12**	**20**	**.950**	**3**	**1910 to 2000**	**Males are more likely to play with mechanical & construction objects**
Competitive social play in general	**9.5.1.14**	**17**	**.941**	**2**	**1930 to 2002**	**Males are more likely to engage in competitive social play**
Rough-and-tumble play	**9.5.1.18a**	**73**	**.973**	**7 (1+)**	**1910 to 2003**	**Males are more likely to engage in rough-and-tumble play**
Involvement in sports emphasizing direct competition	**9.5.2.4**	**30**	**1.000**	**5**	**1913 to 2001**	**Males are more involved in sports emphasizing direct competition**
Watching television	9.5.4.1	15	.667	6	1963 to 2002	Males watch more television
Using the internet/computers	9.5.4.2	35	.800	12 (5+)	1988 to 2003	Males probably use computers more

13.2.9f. Sex Differences in Aggression

Aggression can manifest itself in several forms. The only form of aggression that Grand Split-Table 13.2.9f suggested is universally well established is that of an offensive physical nature among children.

Grand Split-Table 13.2.9f. Generalizations from tables in Chapter 9 containing ten or more studies of sex differences in humans.

Variable Name	Table Number	# Studies	Consist. Score	Diversity Score	Time Range	Generalization
Offensive physical aggression or aggression in general (prepubertal)	**9.6.1.1a**	**137**	**.927**	**19 (5+)**	**1933 to 2004**	**Prepubertal males use more physical aggression**
Offensive physical aggression or aggression in general (postpubertal)	9.6.1.1b	141	.830	22 (2+)	17th c to 2005	Postpubertal males probably use more physical aggression
Physical aggression among mental patients	9.6.1.4	26	.308	8 (1+)	1980 to 2003	No established sex difference
Experimentally induced aggression	9.6.1.5	37	.730	1	1951 to 1982	Males probably display more experimentally induced aggression
Indirect (displaced) aggression (e.g., slamming doors, throwing things)	9.6.2.1	47	.213	10 (1+)	1930 to 2000	No established sex difference
Direct verbal aggression	9.6.2.2	86	.430	12 (1+)	1934 to 2005	No established sex difference
Indirect verbal aggression	9.6.2.3	34	.794	11	1992 to 2005	Females probably use more indirect verbal aggression

13.2.9g. Sex Differences in Sexuality

Several gender differences in sexuality are identified in Grand Split-Table 13.2.9g. Males are clearly more likely than females to initiate or attempt to initiate sexual intimacy. Similarly, they appear to be more assertive and coercive in their sexuality. Nearly all studies have found that males report having more sexual partners than females, and the relative age of both married and dating partners tends to be older for males than for females.

Grand Split-Table 13.2.9g. Generalizations from tables in Chapter 9 containing ten or more studies of sex differences in humans.

Variable Name	Table Number	# Studies	Consist. Score	Diversity Score	Time Range	Generalization
Initiating, or attempting to initiate, sexual intimacy	**9.7.1.6**	**13**	**1.000**	**2**	**1979 to 2003**	**Males are more likely to initiate sexual intimacy**
Pushy/assertive sexual overtures and sexual coercion	**9.7.1.8**	**10**	**.900**	**2**	**1984 to 1996**	**Males are more likely to use sexual coercion**
Premarital sexual intercourse	9.7.1.13	78	.615	19 (1+)	1938 to 2004	Males possibly engage in more premarital sexual intercourse
Age of first sexual intercourse	9.7.1.14	51	.098	15 (2+)	1969 to 2003	No established sex difference
Number of sex partners	**9.7.1.15**	**51**	**.941**	**17 (2+)**	**1953 to 2005**	**Males have more sex partners**
Sexual experience with same sex (homosexual behavior)	9.7.1.21	18	.611	5	1934 to 2005	Males are possibly more likely to have same-sex sexual experience
Being or having been married	9.7.2.1	14	.714	7	1959 to 2004	Males are probably more likely to be married
Relative age of married or dating couples	**9.7.2.3**	**48**	**.938**	**20 (7+)**	**17th Century to 2004**	**On average males are older than their partners**
Divorce initiation	9.7.2.7	17	.824	4	1925 to 1996	Females are probably more likely to initiate divorce

13.2.10. Sex Differences in Consuming and Individual-Institutional Behavior (Chapter 10)

Consuming behavior basically covers the consumption of drugs and food, and individual-institutional behavior deals with how individuals interact with social institutions. The following four grand split-tables summarize the findings of tables contained in Chapter 10 with more than ten citations to studies of humans.

13.2.10a. Sex Differences in Consuming Behavior

According to Grand Split-Table 13.2.10a, nearly all studies have found females to be more likely than males to consume medications in general, nonprescription drugs, and legal drugs (other than alcohol and tobacco) that alter mood or behavior.

Grand Split-Table 13.2.10a. Generalizations from tables in Chapter 10 containing ten or more studies of sex differences in humans.

Variable Name	Table Number	# Studies	Consist. Score	Diversity Score	Time Range	Generalization
Ingesting medications (legal drugs) in general	**10.1.3.2**	**20**	**.950**	**1**	**1975 to 1982**	**Females ingest more medications in general**
Consuming nonprescription (over-the-counter) drugs	**10.1.3.3**	**11**	**.909**	**2**	**1976 to 1991**	**Females consume more nonprescription drugs**
Consuming prescription drugs in general	10.1.3.5	11	.818	5 (1+)	1970 to 2004	Females probably consume more prescription drugs in general
Consuming legal mood or behavior altering drugs in general	**10.1.3.6**	**29**	**.966**	**6 (2+)**	**1960 to 1999**	**Females consume more mood or behavior altering drugs in general**

13.2.10b. Sex Differences in Consuming Behavior

Grand Split-Table 13.2.10b indicates that males consume alcohol in greater quantities and forms, especially to excess. Males are also more likely than females to consume a wide variety of other largely illegal drugs. Interestingly, while greater proportions of males appear to smoke cigarettes than do females, they are more likely to successfully quit once a regular smoking habit has been established.

Grand Split-Table 13.2.10b. Generalizations from tables in Chapter 10 containing ten or more studies of sex differences in humans.

Variable Name	Table Number	# Studies	Consist. Score	Diversity Score	Time Range	Generalization
Alcohol consumption in general	10.1.4.1	213	.859	32 (5+)	1953 to 2005	Males are more likely to consume alcohol
Amount of alcohol consumed/ frequency of alcohol consumption	**10.1.4.2**	**24**	**.958**	**3**	**1974 to 1983**	**Males consume greater quantities of alcohol**
Alcohol abstinence	**10.1.4.3**	**21**	**.952**	**5**	**1947 to 2004**	**Females are more likely to abstain from drinking alcohol**
Consuming beer	**10.1.4.4**	**12**	**.917**	**3**	**1953 to 1985**	**Males consume more beer**
Age of onset of alcohol consumption	**10.1.4.5**	**12**	**1.000**	**2**	**1937 to 1997**	**Males initiate alcohol consumption at an earlier age**
Exhibiting alcohol-related problems	**10.1.4.6**	**39**	**.923**	**6**	**1947 to 2005**	**Males exhibit more alcohol-related problems**
Light to moderate drinking	10.1.4.7	11	.091	9	2000 to 2005	No established sex difference
Excessive/heavy alcohol consumption (drunkenness/intoxication/alcohol abuse)	**10.1.4.8**	**43**	**.953**	**13 (1+)**	**1968 to 2005**	**Males are more likely to abuse alcohol**
Binge drinking	**10.1.4.9**	**15**	**1.000**	**6**	**1978 to 2004**	**Males are more likely to binge drink**
Smoking cigarettes in general (prepubertal and adolescents)	10.1.5.1a	53	.170	20 (1+)	1959 to 2005	No established sex difference
Smoking cigarettes in general (adult)	10.1.5.1b	55	.582	24 (2+)	1965 to 2004	Adult males are possibly more likely to smoke cigarettes
Smoking cigarettes in general (multiple age categories)	10.1.5.1c	89	.775	36 (1+)	1925 to 2005	Males are probably more likely to smoke cigarettes regardless of age
Smoking cessation (quitting smoking by regular smokers)	**10.1.5.5**	**52**	**.904**	**10**	**1966 to 2004**	**Males are more likely to successfully quit smoking**
Severity of withdrawal symptoms associated with smoking cessation	10.1.5.6	15	.133	3	1967 to 2004	No established sex difference
Consuming illegal drugs (general/nonspecific)	**10.1.6.1**	**32**	**.938**	**11**	**1974 to 2004**	**Males are more likely to consume illegal drugs**
Consuming/using marijuana	10.1.6.8	22	.545	11	1970 to 2005	Males are possibly more likely to use marijuana
Consuming opiates	10.1.6.10	13	.769	8	1989 to 2004	Males are probably more likely to consume opiates
Self-reported illegal drug use/possession/sale	10.2.1.1	66	.636	16	1969 to 2004	Males are possibly more likely to report illegal drug use

13.2.10c. Sex Differences in Criminality Other Than Drug Offending

Several sex differences in criminality appear to be universal according to Grand Split-Table 13.2.10c. Specifically, males have been found to self-report committing more property offenses than is true for females. Nearly all studies have found males self-reporting higher offending rates overall as well. Regarding, officially recorded offending, males appear to surpass females in violent criminality and for crime in general. Males are also more likely than females to carry weapons, and to commit traffic violations.

Grand Split-Table 13.2.10c. Generalizations from tables in Chapter 10 containing ten or more studies of sex differences in humans.

Variable Name	Table Number	# Studies	Consist Score	Diversity Score	Time Range	Generalization
Self-reported offending in general	**10.2.2.1**	**77**	**.948**	**22 (1+)**	**1947 to 2005**	**Males are more likely to report offending**
Self-reported property offending	**10.2.2.3**	**20**	**1.000**	**6 (1+)**	**1926 to 2004**	**Males are more likely to report property offending**
Officially reported offending in general (excluding strictly illegal drug and sex offenses)	**10.2.2.4**	**131**	**.977**	**30 (7+)**	**17th c to 2004**	**Males commit more officially recorded offenses**
Officially reported violent offending	**10.2.2.5**	**102**	**.971**	**27 (13+)**	**13th c to 2005**	**Males commit more violent offenses**
Officially reported property offending	10.2.2.6	26	.885	8 (1+)	19th c to 2004	Males commit more property offenses
Carrying weapons	**10.2.2.7**	**11**	**1.000**	**4**	**1995 to 2001**	**Males are more likely to carry weapons**
Criminal recidivism	10.2.2.8	19	.684	5	1969 to 2005	Males are possibly more likely to recidivate
Traffic violations/reckless driving	**10.2.2.9**	**14**	**.929**	**4**	**1970 to 1996**	**Males commit more traffic violations**

13.2.10d. Sex Differences in Criminality Other Than Drug Offending, Continued

As shown in Grand Split-Table 13.2.10d, according to all of the available research, males are more likely than females to perpetrate acts of sexual assault.

Grand Split-Table 13.2.10d. Generalizations from tables in Chapter 10 containing ten or more studies of sex differences in humans.

Variable Name	Table Number	# Studies	Consist Score	Diversity Score	Time Range	Generalization
Engaging in courtship violence (intimate partner violence)	10.2.3.2	41	.537	4	1980 to 2002	Females possibly engage in more courtship violence
Engaging in domestic violence (spouse abuse) in general	10.2.3.3	32	.000	6	1971 to 2004	No established sex difference
Perpetrator of rape or sexual assault	**10.2.3.7**	**10**	**1.000**	**1**	**1980 to 1994**	**Males are more likely to sexually assault**

13.2.11. Sex Differences in Stratification and Work-Related Behavior (Chapter 11)

Considerable research has been conducted on sex differences in stratification and work-related behavior. As the following section will show, this research has lead to the discovery of numerous apparently universal sex differences.

13.2.11a. Sex Differences in Dominance and Preparation for Work

According to Grand Split-Table 13.2.11a, there are at least three aspects of work preparation that seem to universally distinguish males and females. First, females spend more time studying, attending class, and paying attention in classes than do males. Regarding areas of study, males have been shown to be more likely than females to major in engineering and in the physical sciences.

Grand Split-Table 13.2.11a. Generalizations from tables in Chapter 11 containing ten or more studies of sex differences in humans.

Variable Name	Table Number	# Studies	Consist. Score	Diversity Score	Time Range	Generalization
Dominance in general	11.1.1.1a	47	.809	9	1933 to 2002	Males are probably more dominant
Dominance-striving/status striving (career aspirations)	11.1.1.6	12	.333	4	1969 to 2003	No established sex difference
Years of education in general	11.2.1.1	50	.460	23 (10+)	1967 to 2004	No established sex difference
Time spent studying, attending class, and paying attention in class	**11.2.1.3**	**15**	**1.000**	**7**	**1929 to 2005**	**Females spend more time studying, attending class, and paying attention in class**
Attending secondary school	11.2.1.6	11	.364	7 (2+)	1973 to 2003	No established sex difference
Graduating from high school	11.2.1.8	34	.176	18 (1+)	1971 to 2003	No established sex difference
Having attended (or are attending) college	11.2.1.9	35	.200	13 (6+)	1956 to 2004	No established sex difference
Graduating from college	11.2.1.11	43	.163	22	1960 to 2003	No established sex difference
Receiving advanced/graduate degree	11.2.1.13	16	.563	7 (1+)	1960 to 2004	Males possibly receive more advanced degrees
Majoring/taking advanced undergraduate courses in engineering	**11.2.2.11**	**21**	**.953**	**6 (1+)**	**1980 to 2004**	**Males are more likely to major in engineering**
Majoring in (or taking advanced courses in) mathematics	11.2.2.19	41	.854	12 (1+)	1972 to 2004	Males are more likely to major in mathematics
Majoring/taking advanced undergraduate courses in physics, chemistry, or general physical science	**11.2.2.21**	**46**	**.978**	**11 (11+)**	**1963 to 2004**	**Males are more likely to major in one of the physical sciences**

13.2.11b. Sex Differences in Work and Occupations

Grand Split-Table 13.2.11b shows that numerous sex differences in work and occupations exhibit extremely high consistency scores. Among the generalizations one can make are that males are more likely to be employed full time, and, among full-time workers, males work longer hours. Predictably, both sexes were found to gravitate toward sex-typical occupations, and the absolute universality of these patterns is certainly impressive. Also impressive is the universality of the tendency for males to surpass females in holding administrative, managerial, and executive positions.

In terms of specific types of occupations, more males are in law enforcement and more females are in nursing occupations in all societies where sex differences in these occupations have been investigated. Also, strong evidence suggests that more males than females are elected to political office and are scientists, engineers, and college professors.

Grand Split-Table 13.2.11b. Generalizations from tables in Chapter 11 containing ten or more studies of sex differences in humans.

Variable Name	Table Number	# Studies	Consist. Score	Diversity Score	Time Range	Generalization
Participation in the paid workforce in general	11.3.1.1	89	.843	51 (11+)	1971 to 2003	Males are probably more likely to be in the paid workforce
Full time employment in general	**11.3.2.1**	**31**	**1.000**	**11 (6+)**	**1967 to 2003**	**Males are more likely to be employed full time**
Hours worked per day or week as part of one's job or profession	**11.3.3.4**	**19**	**1.000**	**5 (1+)**	**1985 to 2004**	**Males work longer hours**
Filling masculine occupations (male sex-typical occupations)	**11.3.5.1**	**42**	**1.000**	**12 (2+)**	**1911 to 2004**	**Males are more likely to have male sex-typical occupations**
Filling feminine occupations (female sex-typical occupations)	**11.3.5.2**	**22**	**1.000**	**8 (2+)**	**1970 to 2003**	**Females are more likely to have female sex-typical occupations**
Occupational prestige	11.3.5.6	19	.474	6 (1+)	1964 to 2001	No established sex difference
Jobs involving managerial/ administrative/supervisory responsibilities or control	***11.3.5.7***	***58***	***1.000***	***8 (4+)***	***1967 to 2001***	***Males are more likely to have managerial, administrative, and supervisory type jobs***
Foraging and gathering behavior	11.3.5.18	17	.059	4 (12+)	1973 to 2003	No established sex difference
Construction/carpentry occupations	11.3.6.17	11	.364	2 (9+)	1973 to 2000	No established sex difference
Corporate executive officer (CEO)/manager	**11.3.6.19**	**18**	**1.000**	**7 (1+)**	**1977 to 2004**	**Males are more likely to be corporate executive officers**
Law enforcement/police officer	**11.3.6.32**	**14**	**1.000**	**4**	**1953 to 2002**	**Males are more likely to have jobs in law enforcement**
Manufacturing/production occupation	11.3.6.37	24	.125	3 (2+)	1973 to 2001	No established sex difference
Nursing	**11.3.6.39**	**12**	**1.000**	**7**	**1975 to 2004**	**Females are more likely to be nurses**
Physician	11.3.6.43	21	.524	8	1969 to 2003	Males are possibly more likely to be physicians
Politician: holding elected political office	**11.3.6.46**	**73**	**.986**	**15 (7+)**	**1930 to 2004**	**Males are more likely to hold elected offices**
Scientist and engineer (outside of academia)	**11.3.6.48**	**21**	**1.000**	**4**	**1965 to 2000**	**Males are more likely to be scientists and engineers**
Teacher: College professors	**11.3.6.54**	**18**	**1.000**	**7 (2+)**	**1969 to 2004**	**More college professors are males**
Teacher: Primary and secondary teacher	11.3.6.55	17	.765	6	1971 to 2004	Females are probably more likely to be primary and secondary school teachers

13.2.11c. Sex Differences in Earnings and Types of Work Performed

A vast amount of research has focused on gender differences in earnings and in the types of work performed. Grand Split-Table 13.2.11c shows that eight tables in Chapter 11 pertaining to these differences reached or surpassed .9000 consistency. Three of these tables pertained to salaries, all of which suggested that throughout the world males earn more than females, both overall and within specific occupations where both men and women are represented. Similarly, one table documented that males tend to be promoted more rapidly than females and that the salaries of males tend to increase more rapidly. Regarding the types of work performed, females appear to perform more household chores and they tend to engage in more parenting activities than males.

Grand Split-Table 13.2.11c. Generalizations from tables in Chapter 11 containing ten or more studies of sex differences in humans.

Variable Name	Table Number	# Studies	Consist. Score	Diversity Score	Time Range	Generalization
Earnings/salaries for workers except North America regardless of occupation	**11.3.7.1a**	**131**	**.924**	**37 (24+)**	**1967 to 2005**	**Males almost certainly earn more money outside of North America (regardless of occupation)**
Earnings/salaries for North American workers regardless of occupation	**11.3.7.1b**	**207**	**.981**	**4 (3+)**	**1961 to 2005**	**Males almost certainly earn more money in North America (regardless of occupation)**
Income/salaries for workers for specific occupational areas	**11.3.7.1c**	**53**	**.962**	**3**	**1968 to 2004**	**Males almost certainly have higher salaries in all occupations where both sexes are represented**
Trends in income inequality between the sexes	11.3.7.2	42	.738	6 (2+)	1950 to 2001	Disparity in income between the sexes has probably decreased since the 1960s
Promotion rate/upward mobility in general	**11.3.7.7**	**65**	**.969**	**10 (3+)**	**1964 to 2004**	**Males have a faster rate of promotion**
Sex ratio in an occupation affecting average salary	**11.3.7.11**	**16**	**.938**	**1**	**1974 to 1997**	**As percent of males increases, average salaries increase**
Performing household chores in general	**11.3.8.1**	**144**	**.917**	**31 (7+)**	**1961 to 2004**	**Females perform more household chores**
Involvement in food preparation	11.3.8.3	16	.188	2 (14+)	1971 to 1987	No established sex difference
Involvement in knitting, sewing or making clothes	11.3.8.5	10	.300	2 (8+)	1971 to 1998	No established sex difference
Parenting and childcare activities	**11.3.8.6**	**17**	**1.000**	**7 (+1)**	**1980 to 2004**	**Females are more involved in parenting and childcare activities**
Nursing and caring for family members	11.3.8.7	11	.727	1 (3+)	1973 to 1997	Females probably are more involved in nursing and caring for family members
Publication rates and scholarly productivity	*11.3.9.2*	*27*	*.926*	*5 (1+)*	*1914 to 2004*	*Males have higher publication rates and more scholarly productivity*

13.2.12. Sex Differences in Attitudes and Actions Toward Others Based on Their Sex (Chapter 12)

Chapter 12 is distinctive in that it pertained not to sex differences in some trait but to how people of one sex are perceived and/or behaved toward differently than those of the other sex. Tables throughout this chapter that contained ten or more citations are reviewed below.

13.2.12a. Sex Stereotypes

Grand Split-Table 13.2.12a shows that two stereotypes may be universal. First, while pertinent studies were conducted in just one country (the United States), they all concluded that males were more often stereotyped as being aggressive than were females. Second, males were also believed to be more independent than females.

Grand Split-Table 13.2.12a. Generalizations from tables in Chapter 12 containing ten or more studies of sex differences in humans.

Variable Name	Table Number	# Studies	Consist. Score	Diversity Score	Time Range	Generalization
Beliefs (stereotypes) about being aggressive	**12.1.1.6**	**13**	**1.000**	**1**	**1957 to 1999**	**Males are believed to be more aggressive**
Beliefs (stereotypes) about dominance and status/leadership	12.1.1.34	24	.583	3	1930 to 2004	Males are possibly believed to be more dominant and enjoy higher status
Beliefs (stereotypes) about being independent	**12.1.1.67**	**11**	**1.000**	**3 (1+)**	**1957 to 2002**	**Males are believed to be more independent**

13.2.12b. Assessments and Preferences Based on Another Person's Sex

In choosing social interactants (other than for romantic purposes), all relevant studies have indicated that for a wide range of age groups, same-sex social interactions are preferred over opposite-sex social interactions (Grand Split-Table 13.2.12b).

Grand Split-Table 13.2.12b. Generalizations from tables in Chapter 12 containing ten or more studies of sex differences in humans.

Variable Name	Table Number	# Studies	Consist. Score	Diversity Score	Time Range	Generalization
Correctly judging someone's gender based entirely on writing style	12.1.2.1	17	.765	4	1906 to 2005	Gender can probably be judged by writing style at an above chance level
Evaluation of employee by supervisor/employer	12.1.3.6	26	.385	4	1957 to 2001	No established sex difference
Evaluation of the quality of writing according to the writer's presumed sex	12.1.3.7	13	.385	1	1968 to 1984	No established sex difference
Parental preference regarding the sex of their offspring	12.1.5.1	52	.827	24 (4+)	19th c to 2001	Males are probably preferred as offspring more by parents
Choice of social interactants (same- versus opposite-sex)	**12.1.5.2**	**25**	**1.000**	**5**	**1927 to 2004**	**Same-sex social interactants are generally preferred by both males & females**
Preference for the gender of one's supervisor/manager/leader	12.1.5.8	12	.667	2	1975 to 2002	Males are possibly preferred as supervisors

13.2.12c. Sex Differences in Being the Recipient of Various Forms of Treatment by Others

Grand Split-Table 13.2.12c shows that two tables in Chapter 12 with ten or more citations pertaining to people's treatment of others based on their sex were found with consistency scores at .9000 or higher. One found that in classroom settings, males appear to receive more attention from teachers than do females. The other table suggested that relative to females, males are disciplined more often by teachers.

Grand Split-Table 13.2.12c. Generalizations from tables in Chapter 12 containing ten or more studies of sex differences in humans.

Variable Name	Table Number	# Studies	Consist. Score	Diversity Score	Time Range	Generalization
Parental nurturing behavior	12.3.1.1	15	.400	5	1962 to 2002	No established sex difference
Being breast fed	12.3.1.2	12	.333	6	1972 to 1999	No established sex difference
Receiving nutrition (other than breast milk)	12.3.1.3	15	.733	6	1980 to 1997	Sons probably receive more nutrition from parents
Health care given to offspring	12.3.1.4	12	.833	6	1981 to 2003	Sons probably receive more health care
Controlling/disciplining behavior toward offspring	12.3.1.9	12	.333	4	1957 to 2000	No established sex difference
Physical punishment by parents or adult guardians	12.3.1.10	17	.765	3	1936 to 1998	Males probably receive more physical punishment
Parent-offspring discussions of emotions according to the offspring's sex	12.3.2.3	25	.760	2	1979 to 2002	Parents probably discuss emotions more with daughters
Treatment by physicians or receiving health care in general	12.3.5.7	17	.059	6	1970 to 2003	No established sex difference
Surgical treatment for heart disease	12.3.5.8	30	.833	5	1993 to 2003	Males are probably more likely to receive surgical treatment for heart disease
Being helped or supported by others	12.5.1.2	14	.857	2	1971 to 1990	Females receive more help and support from others
Receiving attention from teachers in general	**12.5.3.2**	**26**	**.923**	**3**	**1963 to 1996**	**Males appear to receive more attention from teachers**
Interactional contact with students by teachers	12.5.3.3	25	.720	4	1956 to 2001	Teachers probably interact more with male students
Receiving praise/reward from teacher	12.5.3.5	15	.200	2	1956 to 1998	No established sex difference
Recipient of teacher discipline	**12.5.3.6**	**16**	**1.000**	**3**	**1952 to 1998**	**Male students receive more discipline**
Sex segregation in school	12.5.3.7	18	.333	7	1974 to 2004	No established sex difference
Evaluation of teacher/instructor by student	12.5.3.8	63	.000	4	1932 to 2003	No established sex difference
Being the recipient of a prominent obituary	12.5.4.6	16	.813	1 (2+)	1975 to 1999	Males probably receive more prominent obituaries
Popularity	12.5.4.7	10	.400	2	1933 to 2001	No established sex difference

13.2.12d. Sex Differences in Victimization

Research findings pertaining to sex differences in tendencies to be victimized by others are summarized in Grand Split-Table 13.2.12d. Three forms of victimization are identified as having 1.000 consistency scores: Females are more often than males to be the victims of sexual harassment and of unwanted sexual advances. Males, on the other hand, are more likely than females to be the victims of crime in general.

Turning to sex differences in being victimized with consistency scores between .9000 and .9999, four are identified in Grand Split-Table 13.2.12d. These scores suggest that females are more often victims of sexual coercion, rape, and sexual abuse than is true for males.

Grand Split-Table 13.2.12d. Generalizations from tables in Chapter 12 containing ten or more studies of sex differences in humans.

Variable Name	Table Number	# Studies	Consist. Score	Diversity Score	Time Range	Generalization
Victim (recipient) of physical aggression in general (except criminal)	12.6.1.2	18	.833	4	1966 to 2005	Males are probably more frequently the victims of physical aggression
Being the victim of dating violence (victim of intimate partner violence)	12.6.1.5	12	.667	3	1985 to 2002	Females are possibly more frequently the victims of dating violence
Being the victim of sexual harassment	**12.6.1.6**	**12**	**1.000**	**4**	**1983 to 2003**	**Females are more likely to be sexually harassed**
Being pressured to have sex	**12.6.1.7**	**11**	**.900**	**1**	**1988 to 1998**	**Females are pressured more often to have sex**
Being physically bullied	12.6.1.8	19	.789	11	1992 to 2004	Males are probably more likely to be physically bullied
Being the recipient of unwelcome/ unwanted sexual behavior	**12.6.1.11**	**11**	**1.000**	**4**	**1976 to 2003**	**Females are more likely to receive unwelcome sexual behavior**
Being the victim of crime in general	**12.6.2.1**	**13**	**1.000**	**5**	**17th c to 1997**	**Males are more likely to be crime victims**
Being the victim of murder	12.6.2.2	54	.815	23 (5+)	13th c to 2005	Males are probably more likely to be murdered
Being the victim of physical assault/violent crime (non-sexual)	12.6.2.3	32	.531	5 (2+)	1967 to 2002	Males are possibly more likely to be criminally physically assaulted
Being the victim of coerced/forced sex	**12.6.2.6**	**18**	**.944**	**6**	**1989 to 2004**	**Females are more likely to be the victims of coerced sex**
Being the victim of rape/sexual assault	**12.6.2.7**	**40**	**.975**	**5**	**1980 to 2004**	**Females are more likely to be sexually assaulted**
Being the victim of sexual abuse	**12.6.2.8**	**14**	**.929**	**5**	**1979 to 2004**	**Females are more likely to be sexually abused**
Being the victim of spouse abuse/violence	12.6.2.10	22	.500	3	1972 to 1999	Females are possibly more likely to be the victims of spouse abuse

13.2.12e. Sex Differences in Mass Media Portrayals

According to Grand Split-Table 13.2.12e, the males who are portrayed in the mass media are older than the women who are portrayed.

Grand Split-Table 13.2.12e. Generalizations from tables in Chapter 12 containing ten or more studies of sex differences in humans.

Variable Name	Table Number	# Studies	Consist. Score	Diversity Score	Time Range	Generalization
Sex of individuals portrayed in the mass media in general	12.7.1.1	34	.647	4	1971 to 2003	Males are possibly portrayed more often in the mass media
Sex of individuals featured in television and magazine commercials	12.7.1.3	12	.250	6	1979 to 2003	No established sex difference
Age of individuals portrayed in the mass media	**12.7.15**	**12**	**1.000**	**2**	**1972 to 2004**	**Males portrayed in the mass media are older**

13.2.12f. Sex Differences in Mass Media Portrayals, Continued

Grand Split-Table 13.2.12f identifies four traits that the mass media portray as different regarding the sexes. Specifically, males are more often portrayed as performing traditional masculine roles, as working outside the home, and as being more physically violent than females. Females, on the other hand, were more often as being involved in work inside the home than were males. All available studies also suggest that male sporting activities are presented in the mass media more often than female sporting activities.

Grand Split-Table 13.2.12f. Generalizations from tables in Chapter 12 containing ten or more studies of sex differences in humans.

Variable Name	Table Number	# Studies	Consist. Score	Diversity Score	Time Range	Generalization
Sex roles and occupational portrayals in mass media other than TV commercials	**12.8.2.2**	**26**	**1.000**	**13 (2+)**	**1972 to 2004**	**Males are more likely to be portrayed as performing traditionally masculine roles**
Portrayals of working outside the home in television commercials	**12.8.2.3**	**14**	**1.000**	**5**	**1972 to 2003**	**Males are more likely to be portrayed as working outside the home**
Portrayals of working inside the home in television commercials	**12.8.2.4**	**18**	**1.000**	**5**	**1972 to 2003**	**Females are more likely to be portrayed as working inside the home**
Portrayals of physical violence and aggression in the mass media	**12.8.2.7**	**15**	**1.000**	**3**	**1974 to 2002**	**Male characters are more likely to be portrayed as physically violent**
Sports coverage according to the sex of the players	**12.8.3.1**	**12**	**1.000**	**4**	**1987 to 2004**	**Sporting activities by males receive more media coverage**

13.3

THE MOST CERTAIN UNIVERSAL SEX DIFFERENCES

How close can science come to identifying irrefutable universal sex differences in humans? To explore this question, we will now simply list generalizations derived from this chapter's grand tables wherein the consistency scores are all 1.000. In other words, only traits for which there were at least ten studies, none of which reported any contradictory evidence, will now be identified.

Beginning with basic biological traits, the universal sex differences are:

- Males are heavier at birth
- Males are taller following late adolescence
- Males have greater physical strength
- Males have a larger 2D:4D finger ratio
- Females have greater joint laxity

Neurological and biochemical factors with sex differences that can be considered universal are:

- The head circumference and cranial capacity of males is larger
- Leptin levels are higher in females

Universal sex differences in health and illness are:

- Females have higher rates of breast cancer
- The age at which one first experiences a heart attack is younger for males
- More females contract lupus
- Females have more headaches in general

In the case of perceptual, motor, and emotional sex differences, those that are universal are:

- Females estimate/perceive greater hazards and injury risks in their environments
- Females have more stress/worry/anxiety associated with providing care to others
- Males are more prone to boredom
- Females cry more as adults

The intellectual, cognitive, self-concept, and mental health/illness that are universal in terms of sex differences are:

- Males have more learning disabilities and difficulties
- More females assess themselves as being overweight (or want to lose weight) more
- Females more frequently attribute failure to internal forces
- Females ruminate over negative emotional experiences more
- Females experience more psychological distress/mental problems in general
- Problem drinking/alcohol dependence is more common among males
- Eating disorders in general are more common in females
- Anorexia nervosa is more common among females
- Females have higher rates of bulimia
- Panic disorders are more common in females
- Males have higher rates of attention deficit hyperactivity disorder/hyperactivity
- Males have higher rates of autism and Asperger syndrome
- Psychoticism is higher among males

Preferences, attitudes, interests, and intensions that exhibit universal sex differences are:

- Liking school in general is more characteristic of females
- Males have greater interest in physical science and technology
- Males are more accepting of aggression as a response to social problem solving
- Males have more interest in watching sporting events
- Males have more interest in participating in sporting activities
- Males have more interest in athletic activities in general
- The desire for promiscuous sex/numerous sex partners is greater for males
- Males have a stronger sex drive/are more interested in sex
- Females are more prone to prefer mates who are taller than themselves
- Females are more prone to prefer mates who are high in social status
- Males prefer mates who are younger than themselves more
- Females prefer mates who are older than themselves more

Regarding personality and general behavior, the universal sex differences are:

- Males explore their environments more
- Females are friendlier
- Males are more hostile
- Males take more risks in career and business decision making
- Females are more feminine
- Females are more likely to use a “cradling” book-carrying style
- Females diet more

Universal sex differences in social (and play) behavior are:

- Females are more likely to establish and maintain eye contact in social interactions
- Females provide more care to their offspring
- In the case of divorce, females retain primary custody of their children more
- Females interact socially in small groups more
- Females are more likely to have intimate friendships
- Females confide/share secrets with friends more
- Males engage in more conversations focused on leisure or work
- Males play more with masculine toys
- Females play with dolls and stuffed animals more
- More females play house and parenting
- Males are involved in directly competitive types of sports more
- Males initiate sexual intimacy more

Sex differences in behavior involving consuming behavior and interactions between individuals and social institutions that can be considered universal are:

- Males begin alcohol consumption at an earlier age
- Males are more likely to binge drink
- Self-reported property crimes are more common among males
- Males carry weapons more
- More males engage in sexual assault

Stratification and work-related behavior that exhibit universal sex differences are:

- Females spend more time studying, attending class, and paying attention in class
- Males are more likely to be employed full time
- Employed males work longer hours
- Males work in male-typical occupations more
- Females work in female-typical occupations more
- Males hold more managerial, administrative, and supervisory jobs
- More corporate executive officers are males
- Males hold more law enforcement jobs
- Females are more likely to be nurses
- Males are more likely to be physical scientists and engineers
- More college professors are males
- Females are more involved in parenting and childcare activities

Finally, universal sex differences in attitudes and actions toward others based on their gender are:

- Males are believed (stereotyped) to be more aggressive
- Males are believed (stereotyped) to be more independent
- As students, males receive more disciplinary measures from teachers
- Same sex social interactants are generally preferred by both sexes
- Females are more likely to receive unwelcome sexual behavior
- Males are more likely to be victims of crime
- Males portrayed in the mass media are older
- Males are portrayed in the mass media more as performing traditionally male-typical roles
- Males are more likely to be portrayed in the mass media as working outside the home
- Females are more likely to be portrayed in the mass media as working inside the home
- Male characters are more often portrayed in the mass media as physically violent
- Sporting activities involving males receive more coverage

In assessing the importance of the above list of universal sex differences, two methodological points are worth emphasizing. First, using the vote-counting methodology and insisting on a consistency score of 1.000 means that every study must have found a statistically significant difference. Thus, the publication of just one study that failed to identify a statistically significant difference (or one that was actually contrary to the majority of studies) would have caused a trait to not appear in this list. The reasons for a study failing to be statistically significant, despite there actually being a sex difference, could include (a) it having been based on a small and/or unrepresentative sample, (b) it utilizing an inappropriate operational measure for the trait being investigated, or (c) it involving a crucial calculation error. This approach makes the vote-counting methodology much more conservative as an estimate of sex differences than a meta-analysis based on an effect size estimate.

Second, new studies of sex differences continue to be published. It is therefore probable that future updates of the tables contained in this book will eventually reveal studies that do not support the universal sex differences indicated in this section.

13.4
FINAL THOUGHTS

The main goals for this book were to summarize what scientific research has collectively revealed thus far about how males and females differ, and, in the process, to identify universal sex differences, should any exist. As is apparent in the preceding section, many universal sex differences can now be specified with a high degree of certainty. Nevertheless, scientists continue to collect new evidence, and in doing so they may eventually unearth exceptions or at least qualifications to what has been determined so far.

Finally, few scientists are merely interested in documenting sex differences; they would also like to explain them. While explanations are beyond the purview of this book, it should facilitate and strengthen efforts to develop causal explanations for sex differences in at least two ways: First, this book has pinpointed the traits that are most in need of explanation. Second, the fact that many sex differences can now be considered universal, while others appear to be quite varied across human cultures, should help researchers narrow down the most likely causes for each. Differences that are truly universal would be virtually impossible to explain solely in terms of social training and cultural traditions. Some underlying biology must be in operation.

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This volume is the first to aim at summarizing all of the scientific literature published so far regarding male-female differences and similarities, not only in behavior, but also in basic biology, physiology, health, perceptions, emotions, and attitudes. Results from over 18,000 studies have been condensed into more than 1,900 tables, with each table pertaining to a specific possible sex difference. Even research pertaining to how men and women are perceived (stereotyped) as being different is covered.

Throughout this book's eleven years in preparation, no exclusions were made in terms of subject areas, cultures, time periods, or even species.

The book is accompanied by a CD containing all 18,000+ references cited in the book.

Sex Differences is a monumental resource for any researcher, student, or professional who requires an assessment of the weight of evidence that currently exists regarding any sex difference of interest. It is also suitable as a text in graduate courses pertaining to gender or human sexuality.

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